NOVEMBER 15, 1954

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

ELECTRONICS

Growth Industry of the Decade

Sales may hit $12 billion by 1960 as commercial, industrial uses mount, p. 85

✓ 'Enginuity' Boosts Reo, p. 99

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New

Take a ~~closer~~ look at what's required to make High Pressure Tubing to handle

30,000 psi

Pressures of 30,000 psi are accepted industrial practice today. They are not only representative of the advances in alloy tubing technology and manufacture, but also of the tremendous strides taken by the industries in which these elevated pressures are everyday working practice.

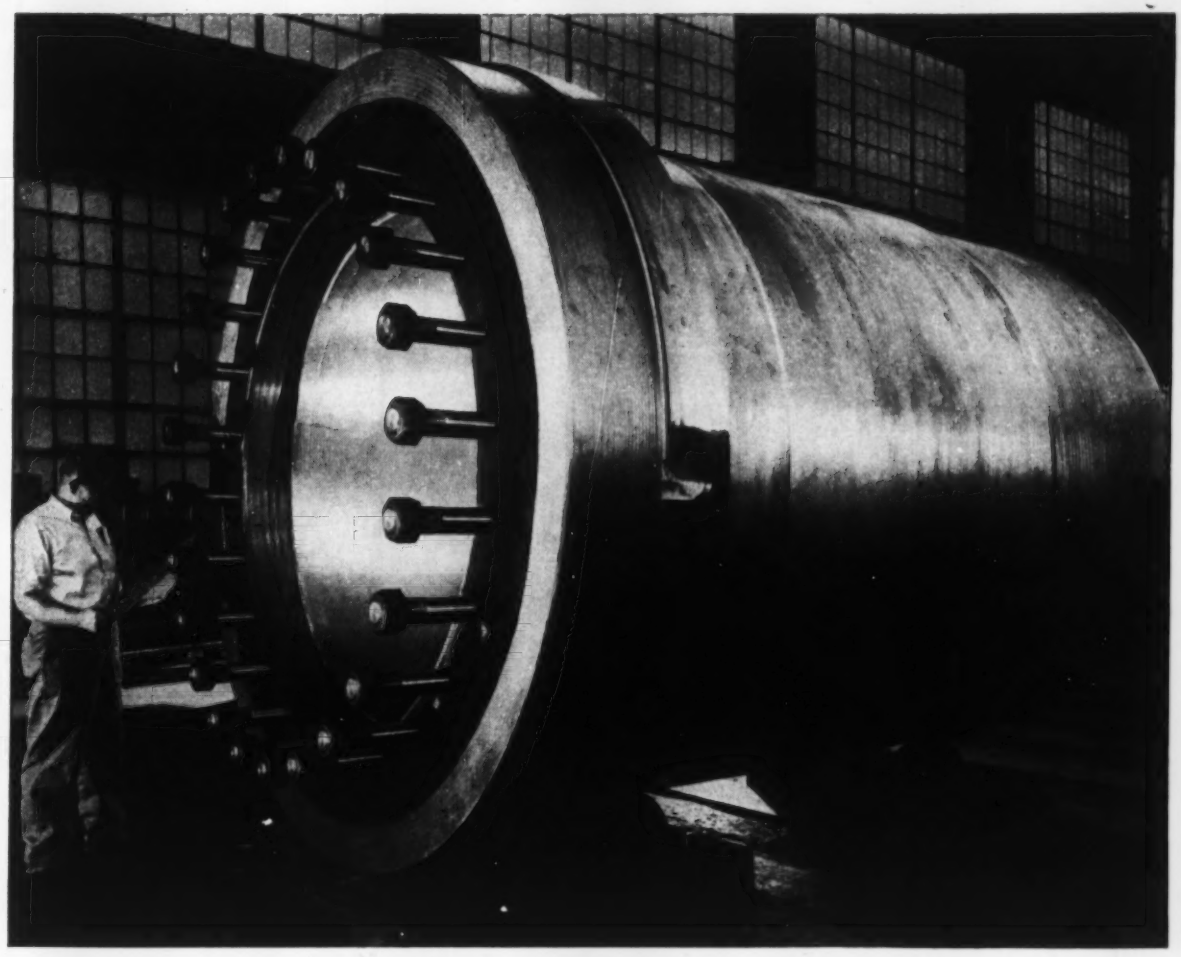
As pressures advance so must manufacturing techniques. For example, B&W was called upon recently to manufacture a special alloy tubing for polyethylene equipment based on Croloy 12 (AISI 410), to prevent product contamination. Special manufacturing and inspection techniques were involved in the production of the tubing which was cold finished to size. It was then heat-treated to obtain 100,000 psi yield strength, which could have been considerably higher except for the fact that toughness was desired to meet the dynamic service stresses encountered in operation. A sample of the tubing then was tested to 80,000 psi and, in order to force rupture at this pressure it was necessary to remove half of the wall thickness by machining. This destructive testing was made to insure satisfactory working conditions *at pressures of 30,000 psi.*

This example, while fulfilling the needs of a specific purpose, serves also to indicate the scope of techniques and facilities you'll find at B&W. Today, with laboratory testing of alloy tubing reaching 200,000 psi, the experience and knowledge of those called upon to make a test a *working reality* are of prime importance. You'll find both at B&W. Call on Mr. Tubes any time to help you meet your needs—standard as well as special.

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
Alliance, Ohio—Welded Carbon Steel Tubing

B&W SEAMLESS and WELDED TUBES

TA-4065(SSP)



76 Tons of Steel Cylinder

This big forging, shaped a good deal like an oversized kettledrum, is actually a steel cylinder for a 14,000-ton extrusion press. While by no means the heaviest forging Bethlehem has made, it is a very sturdy specimen. Also, it happens to have the largest diameter of any forged cylinder we have ever produced.

As shipped, the forging weighed just under 76 tons. It had an overall length of 14 ft, 3¼ in. and a maximum flange diameter of almost 9 ft. The bore at the large end of this cylinder was approximately 71 in.

This was an interesting job, the more so because it required some expert machining. That point about machining deserves special mention, for Bethlehem is equipped to machine any forging to customer specifications. Naturally, an order can be shipped as-forged if desired, but most customers rely on us for much of the machining work.

Your own plans may require forgings larger than the one shown here, or a great deal smaller. In either case, we'll welcome a call from you. Bethlehem makes forgings of every size and type, and it might surprise you to know how big—and how *little*—some of them run. Check with our people the next time you're in the market for forgings of any size.

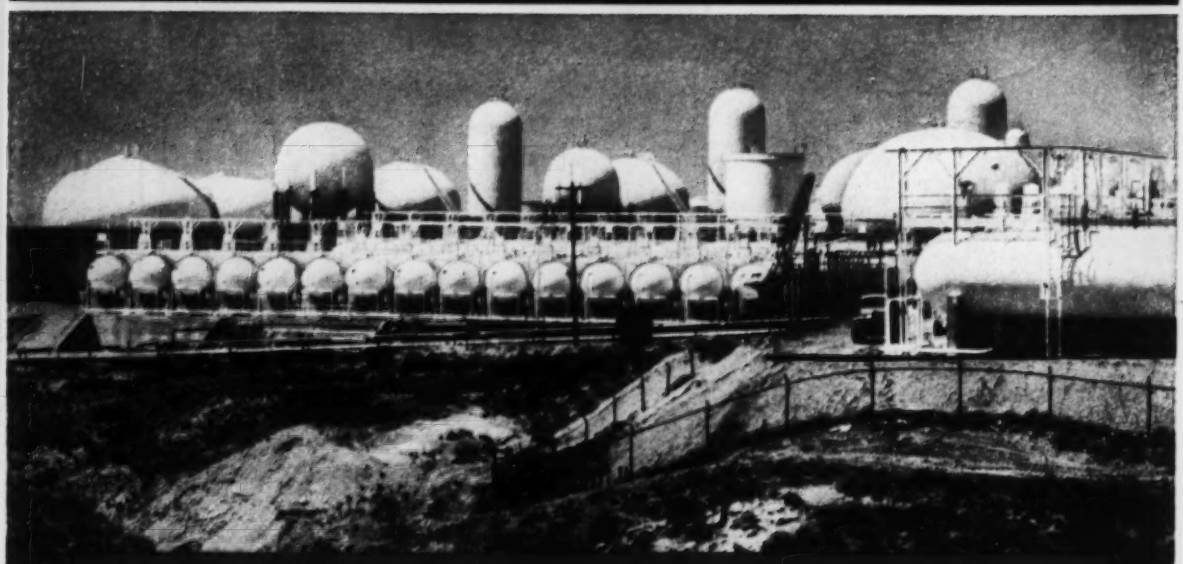
BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM FORGINGS

BETHLEHEM STEEL

*Philgas** IS AMERICA'S LARGEST SELLING LP-GAS



RELY ON PHILLIPS PETROLEUM COMPANY FOR DEPENDABLE SUPPLY!

Phillips tremendous manufacturing, transportation and storage facilities provide dependable supplies of Philgas when and where you need it, even in periods of peak demand. The modern processing plant pictured above is one of Phillips many installations engaged in the manufacture of Philgas. Pipelines carry Philgas to strategically situated underground storage facilities. Phillips maintains its own fleets of tank cars and trucks to insure prompt deliveries.

● There is no cleaner fuel than Philgas. This quality LP-Gas is produced and processed by Phillips Petroleum Company to rigid standards of purity. It is free from harmful contaminants. You can rely on it for high thermal values, uniform gravity and pressures. In addition, the automatic features of a Philgas system keep your labor costs low.

Leading industries are using Philgas profitably for core baking, mold drying, heat treating, ceramic operations, food processing, textile finishing, space heating, metal cutting, and as a clean, economical motor fuel. Write for full information. It will pay you to find out how Philgas can cut down your operating costs . . . and how it can increase your profits.

*Philgas is the Phillips Petroleum Company trademark for its high quality propane-butane LP-Gas or bottled gas.

Phillips 66 Philgas
THE ALL-PURPOSE FUEL

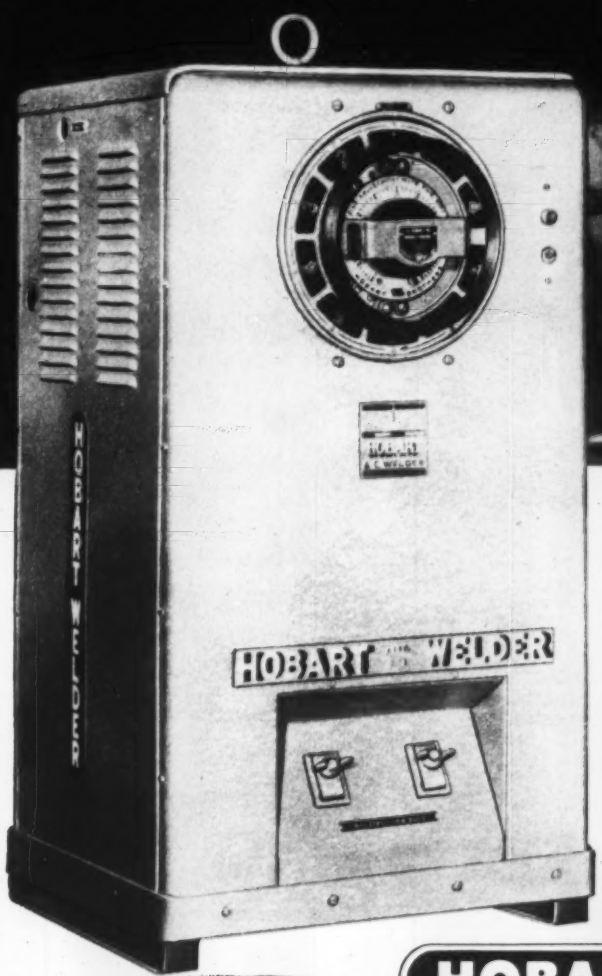
PHILLIPS PETROLEUM COMPANY

Sales Department • Bartlesville, Oklahoma

Offices located in Amarillo, Tex., Atlanta, Ga., Chicago, Ill., Denver, Colo., Des Moines, Ia., Indianapolis, Ind., Kansas City, Mo., Minneapolis, Minn., New York, N. Y., Omaha, Nebr., Raleigh, N. C., St. Louis, Mo., Tampa, Fla., Tulsa, Okla., Wichita, Kans.

In addition to the Hobart Line of rotating Type Arc Welders, powered by electric motors and gasoline engines,

This New HOBART Transformer Welder is now available



It embodies Hobart's new "saturable leakage path" design (patent applied for) that assures you higher quality welding, lower welding costs, and improved weld quality.

A few of the outstanding features are "Pre-Surge" Inherent Arc Striking, Continuous Current Control, Double Overload Protection, Dual Control, Remote Control, Shrouded Fan Super Cooling, and many others.

Your Hobart Distributor will be glad to show you the advantages of this new AC welder. Hobart products are sold and serviced by leading welding supply houses in all principal cities. If you cannot locate the name nearest you, let us know and we'll promptly supply the name and address.

HOBART TROY OHIO WELDERS

HOBART BROTHERS CO., Box ST-114, Troy, Ohio

Phone 21223 "One of the world's largest builders of arc welders and welding equipment"

Here's a great rod for A.C. work.

Rocket 24

Ask your dealer!

Here's an electrode that has greater strength, speed, smoothness and more maneuverability. It's a mild steel general purpose rod for DC or AC welding. The Rocket 24 is a contact type electrode, heavily coated, employing iron powder in the coating which becomes an additional source of metal for the weld. It forms a flat, finely rippled bead with a minimum of undercut. Check coupon for complete details on this revolutionary new electrode.

HOBART BROTHERS CO., Box ST-114, Troy, Ohio, U. S. A.

Send information, without obligation, on the items checked below:

☐ AC Transformer Welder ☐ Rocket No. 24 Electrodes

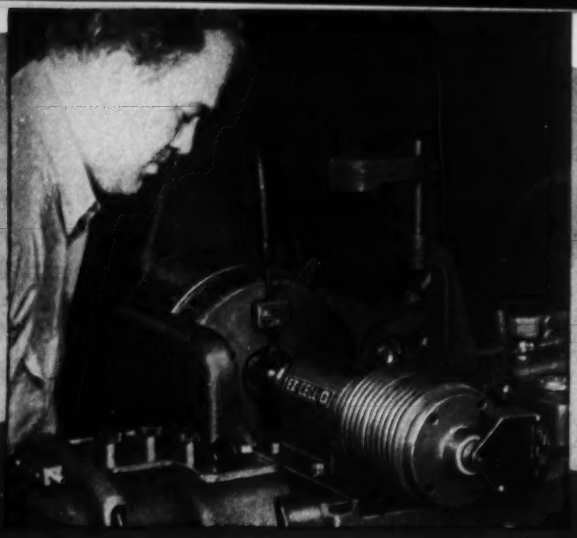
☐ Name of distributor nearest me ☐ Other_____

NAME_____ FIRM_____

ADDRESS_____

CITY_____ STATE_____

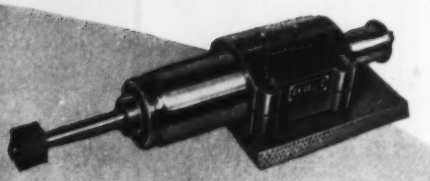
HOBART WELDERS, ELECTRODES



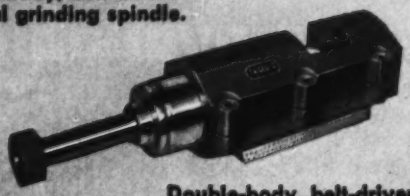
Grinding small holes with an Ex-Cell-O 25,000 RPM High Frequency Motorized Spindle

PRECISION SPINDLES

Built for Your Work



Single-body, belt-driven internal grinding spindle.



Double-body, belt-driven internal grinding spindle.

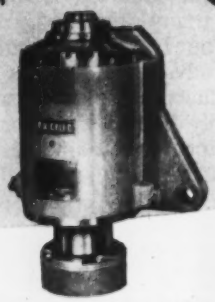
25 hp heavy duty precision spindle with 24" grinding wheel.

25,000 rpm high frequency inbuilt motor spindle.

Totally enclosed inbuilt motor surface grinder spindle.

Precision inbuilt motor spindle for cutter grinder.

Heavy duty motorized precision spindle available up to 20 hp



Get the most from your precision grinding operations by using the Ex-Cell-O Spindle that's made especially for the job.

Ex-Cell-O Precision Spindles have long been the original equipment choice of leading grinder manufacturers. They are rigid and smooth-running. For high precision work they are fitted with standard Ex-Cell-O Precision Ball Bearings; for slower speeds and heavier cuts they are equipped with heavy-duty Ex-Cell-O Precision Ball Bearings. They require no lubrication or adjustment. Phone your Ex-Cell-O representative or write to Ex-Cell-O in Detroit today for catalog 25962 listing hundreds of standard grinding spindles.

XLO

EX-CELL-O for PRECISION

EX-CELL-O

CORPORATION

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

53-32

This Week in Metalworking

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

Vol. 135 No. 20 November 15, 1954

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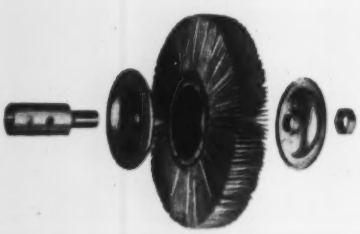
for light grinding and polishing

GRIND-O-FLEX

FLEXIBLE GRINDING WHEEL

This fast-cutting grinding wheel removes burrs, flash, tool marks from contoured parts without digging into the metal. Consists of hundreds of "leaves" of aluminum-oxide cloth sealed to a core. Attaches to your present power tools or any rotating spindle. No special equipment to buy. Wide range of grits. Safe and easy to use. Mount several wheels side by side for any required width. There's nothing like it.

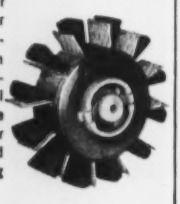


For finishing complex contours

SAND-O-FLEX

BRUSH-BACKED ABRASIVE WHEELS

Use Sand-O-Flex for lighter and more intricate contour work on metals, plastics, wood, rubber, etc. Cannot gouge, "flat" or mar surfaces. Attaches to motor shaft or power tools. Available in four sizes from portable to heavy-duty production line models. Refill abrasive cartridges range from coarse to very fine for all types of finishing and polishing. Write for catalog and prices.



MERIT PRODUCTS, INC.

4023 IRVING PLACE, CULVER CITY, CALIF.

behind the scenes

Greeks Had A Word For It

Our cover this week leads you into a story on electronics. What does that word mean to all of us? Well, to the Greeks, "electron" meant amber, but they never called it that, because "amber" is an old French word, and at the time the Greeks were noting the strange behavior of the stuff in the presence of friction there wasn't any old French. Our own experience with the word "electron" is limited to the memory of a wonderful steam ferryboat named the "Electronic"; in our juvenile innocence, we thought it was the "Alec Tronick". To business men, however, with an eye toward more business, ELECTRONICS is a word that ought to be capitalized, because it represents a booming industry that invites close attention.

From a capital view, it is easier to enter the electronics field than many other industries you can name. Until now, radio and television have accounted for more than half the volume of the electronics business, but economic soothsayers point prophetically toward automation and utter mewing cries; you know, those eager sounds that suggest the preliminary utterances of a cat when it is about to tie into a pound of liver.

Assist from Ambrose

Dollar sales in electronics may reach $8 billion this year. By 1960—ready with that investment?—sales could exceed $12 billion. Ambrose, the ambidextrous office boy, was so excited about the subject he handed us the following note:

A spendthrift from old Housatonic
Explained why he bought Electronics:
Said he, "I am blessed,
'Cause the dough I invest
Returns at a speed supersonic."

Operation Flying Machine

We are betting that your inquiring and intelligent gaze will stop a little east of here at an article revealing facts and figures on this controversial business of company-owned planes. STEEL's editors worked hard on this one, in testimony whereof it may now be revealed that we caught them at it. It so happened that one night during the week editors Bob Love and Art Zimmerman were digging up inside dope on the subject, we were at a suburban Chamber of Commerce meeting. The good burghers were assembled to consider freeways and the unlikely things that might happen in the course of their development. Our civic interest in this subject was stirred by the possibility that some morning we might wake up and find a super highway cutting diagonally through our petunia bed. A situation of that nature, you know, would be fraught with something, and well worth considering. Helping us to view with alarm was Bill Crowell, Public Relations Director of Thompson Products, Inc.—and that brings us back to the company-owned planes, because Mr. Crowell told us that our eager editors had already sought his opinion on the matter.

"Your boys were really digging," said Mr. Crowell. "Out at Thompson we had taken our plane for granted. Why, I don't know how our top management could *operate* without it. It will be interesting to learn the attitude of other companies toward company-owned planes."

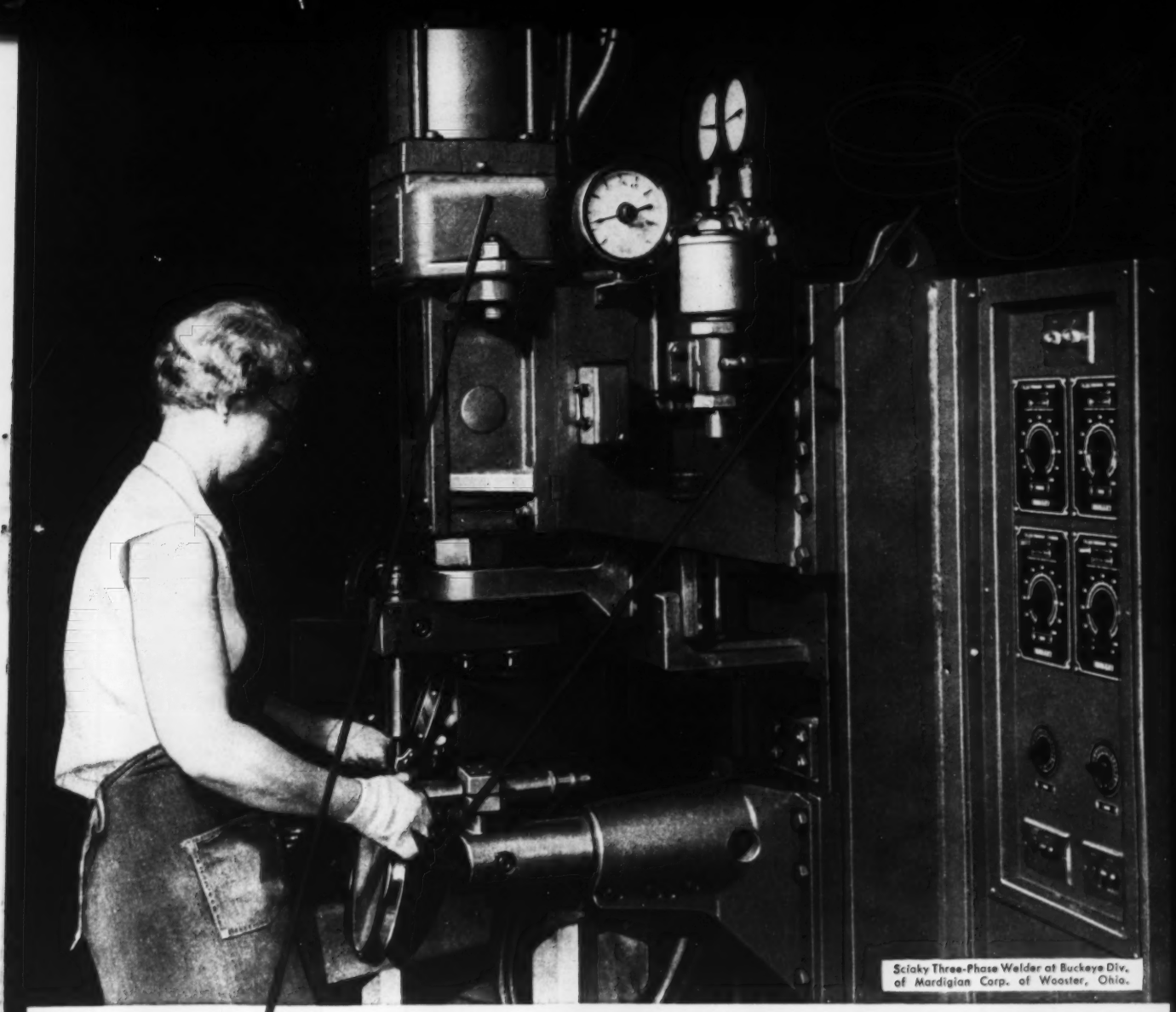
So there you are; never can tell where or when you might cut the trail of STEEL's editorial beavers.

Dig Those Damages

News has reached us from California concerning Alfred the Monster. Alfred is a pile-driver, billed as the world's heaviest. Shortly after the machine had finished work on the foundations for a 26-story building, San Franciscans turned out in great good humor for a farcical funeral for Alfred. Now the building's owners and contractors, who so recently had laughed and smiled and showed their gold teeth at the phony funeral, are shedding real tears. Owners of a 3-story building half a block away complained that Alfred shook the earth so hard their building cracked, so they filed suit for $100,000 damages against the new building's owners and contractors.

Shrdlu

(Metalworking Outlook—Page 77)



Sciaky Three-Phase Welder at Buckeye Div. of Mardigian Corp. of Wooster, Ohio.

PRODUCTION JUMPS 375%...

Costs Cut Sharply with Sciaky Patented Three-Phase Welders

FACTS ABOUT SCIAKY PATENTED THREE-PHASE

	SINGLE-PHASE	SCIAKY THREE-PHASE	SAVINGS
TRANSFORMER RATING	250 KVA	100 KVA	150 KVA
WELDING KVA DEMAND	650 KVA	325 KVA	325 KVA
LINE AMPS PER CONDUCTOR 440 V.	1,476 A.	430 A.	1,046 A.
POWER FACTOR	30%	85%	Greatly Improved
INSTALLATION COST—EST.	$10,500	$5,250	$5,250

Buckeye, with an enviable 52 year record of manufacturing, uses Sciaky patented Three-Phase Balanced Load, High Power Factor resistance welders extensively in fabricating high quality aluminum kitchenware. Standard Sciaky Three-Phase Welders increased production 375% over riveting in joining a variety of handle mounting brackets to different size pans. Even beyond the savings in costs of rivets and related tooling, Sciaky Balanced Load Three-Phase with 85% power factor (compared to 30% for conventional single phase) and a 50% reduction in power demand, is far less expensive to operate than conventional single phase *unbalanced load* welders. Sciaky Three-Phase readily solves power problems, and further, installation costs are estimated at only half of single phase installation cost. Write today for "Resistance Welding at Work", Vol. 4 - No. 2. Read the complete details of Buckeye's impressive application of Sciaky basic thinking—welders designed to do *more useful work* at *lowest operating cost* with *maximum reliability*.

Largest Manufacturers of Electric Resistance Welding Machines in the World

SCIAKY

Sciaky Bros., 4909 West 67th Street, Chicago 38, Illinois

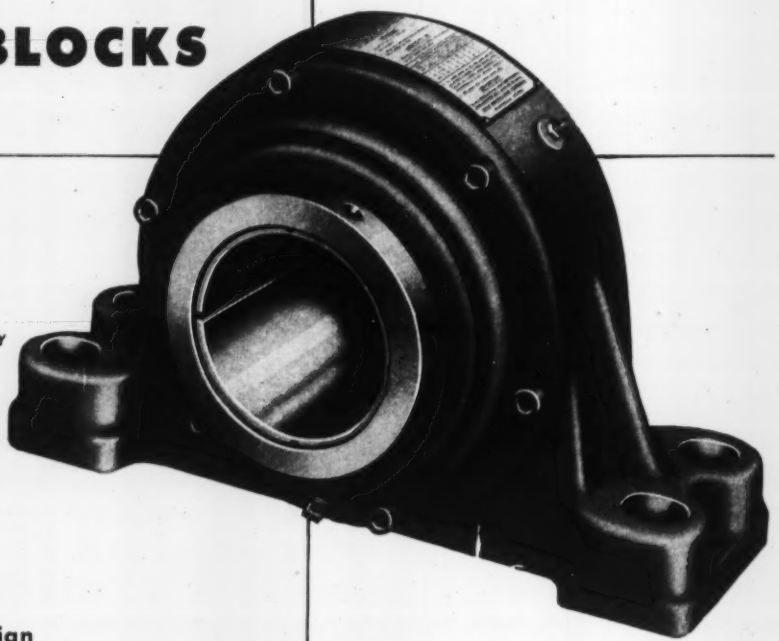
NEW

DODGE-TIMKEN ALL-STEEL PILLOW BLOCKS

HEAVY DUTY CAPACITY!

●

LESS SPACE! LESS WEIGHT!



A JOINT ENGINEERING DEVELOPMENT BY DODGE AND THE TIMKEN ROLLER BEARING COMPANY

- All-Steel construction
- A new Timken bearing design
- High radial and thrust capacities
- Compact—minimum dimensions
- Minimum weight with maximum strength
- Fully self-aligning with spherical outer race
- Both expansion and non-expansion types
- Adapter mounting, proven through the years
- Double piston ring seals
- Sealed both on and off the shaft
- Fully assembled, permanently adjusted, lubricated and sealed at the factory

Here are the bearings for industry's toughest jobs. High radial and thrust capacities. Stamina to take heavy shock loads. And all-steel construction packs this load-carrying capacity into less weight and less space. Engineers are already specifying "Dodge-Timken All-Steel" for some of America's largest projects. Write for details and delivery dates, or call your Dodge Distributor.

DODGE MANUFACTURING CORPORATION
4400 Union Street, Mishawaka, Indiana

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new cost-saving methods. Look for his name under "Power Transmission Equipment" in your classified phone book.

DODGE
of Mishawaka, Ind.

NAME PLATES
FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY,
CHICAGO THRIFT-ETCHING CORPORATION, 1555 SHEFFIELD AVENUE, CHICAGO 22, ILLINOIS

DEEP DRAWS
That highly desirable characteristic—the ability to take deep draws and intricate shapes without wrinkling or splitting—is one that you'll find in Weirton hot-rolled strip steel.
Careful control from mine through mill, and the use of the most up-to-date equipment and techniques, are what give Weirton hot-rolled strip steels the qualities that deliver the desired results under the most exacting conditions.
Next time you have a design that calls for a hot-rolled strip that can easily take deep draws—call Weirton and be sure.
hot-rolled strip steel from
WEIRTON STEEL COMPANY
Weirton, West Virginia
NATIONAL STEEL CORPORATION
WEIRTON STEEL COMPANY

ANOTHER
H&D FIRST

A New Look IN CORRUGATED BOXES!

Here's a **new** corrugated board with a **new** uniformly brighter color and a **new** smoother-than-ever finish

As another in a long list of "firsts," Hinde & Dauch has produced CORABRITE—an entirely new corrugated board. Over the years, H & D has developed strong, durable boxes to meet an incredible number of packaging needs. Now, to this strength and durability, H & D has added a vastly improved surface.

This lighter, smoother, stronger finish, which will be standard on all Hinde & Dauch regular shipping boxes, is the product of progressive paper chemistry at the laboratories of West Virginia Pulp and Paper Company.

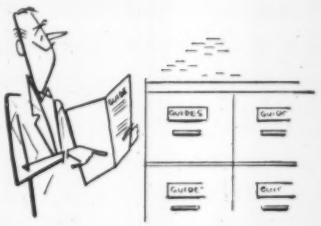
CORABRITE offers a far better printing surface, thus enhancing the advertising value of your shipping boxes. Your boxes will have a more uniform appearance, too—CORABRITE eliminates 80% of the color variation found in natural finish kraft.

Don't wait. Write or call your H & D representative—ask about CORABRITE.

Corabrite

LETTERS
TO THE EDITORS

Guide to Guides



On June 16, 1952, you issued a special report, "Guide for Selecting Tool Steels and Carbides." We are wondering if you have issued any special reports like that since 1952.

R. B. Retzer
Flannery Mfg. Co.
Bridgeville, Pa.

• *Besides the "Guide for Selecting Tool Steels and Carbides," STEEL has published the following guides: "Machine Tool Buyers' Guide," "Guide for Stainless Steel Buyers" and "Guide for Steel Buyers." They are available at $1 per copy.—ED.*

Merit System Has Merit

Several months ago you published an article on merit rating ("Merit Rating—It's One Way To Eliminate Pay Inequities in Your Plant," Aug. 23, p. 60). It can readily be seen that a system as outlined in that article (By assigning numerical values to each degree and factor, the system is set up so that the perfect worker would have 100 points . . .) could be highly advantageous, and I would like to know more about it.

I assume from the article that the particular plan outlined is one furnished by the National Metal Trades Association, and I am wondering if this is some sort of service that must be purchased or if it is simply a matter of purchasing the forms from that association.

Earl J. Kane
Sangamo Electric Co.
Springfield, Ill.

• *The National Metal Trades Association does offer this merit rating system for a fee. For further information, write to association at 122 S. Michigan Ave., Chicago 3.—ED.*

Nebulous Steel Plant

In the "Metalworking Outlook" of the Sept. 27 issue, p. 33, I noted an item on the proposal for construction of a new steel mill in northern California, "New California Steel Mill Talked."

Could you give me any further information regarding that plant?

J. L. Tatman
R. D. 1
Newcomerstown, O.

• *Mt. Shasta Steel & Tube Co. is still in the development stage. We will cer-*

(Please turn to page 12)

Ansul

is the only dry chemical fire extinguisher backed by a five year warranty!

Here is proof of Ansul's superiority . . . *a five year equipment warranty*, the only one of its kind in the fire control industry.

For the buyer of fire equipment this important warranty means many *extra* years of trouble-free protection plus freedom from costly and frequent maintenance checks and repairs.

The special design and construction features that make this warranty possible provide not only dependable protection but also *fast, effective* fire control. Ansul's *weather-tight* construction keeps out moisture and resists corrosion. *Patented nozzles* deliver the right kind of stream for your fire protection problem. The *sealed pressure cartridge* puts Ansul's "Plus Fifty" dry chemical to work immediately—no delay or lag. And finally *rugged construction* makes it possible for Ansul equipment to give peak performance under the toughest operating conditions.

HERE IS THE BIG TRAINING AND SERVICE PLUS OFFERED ONLY BY ANSUL!
Available without cost to all Ansul users.

Training for your personnel at your plant by Ansul specialists.

Customer training school at Marinette for your key safety personnel.

Visual aids on fire control for your safety meetings and other training.

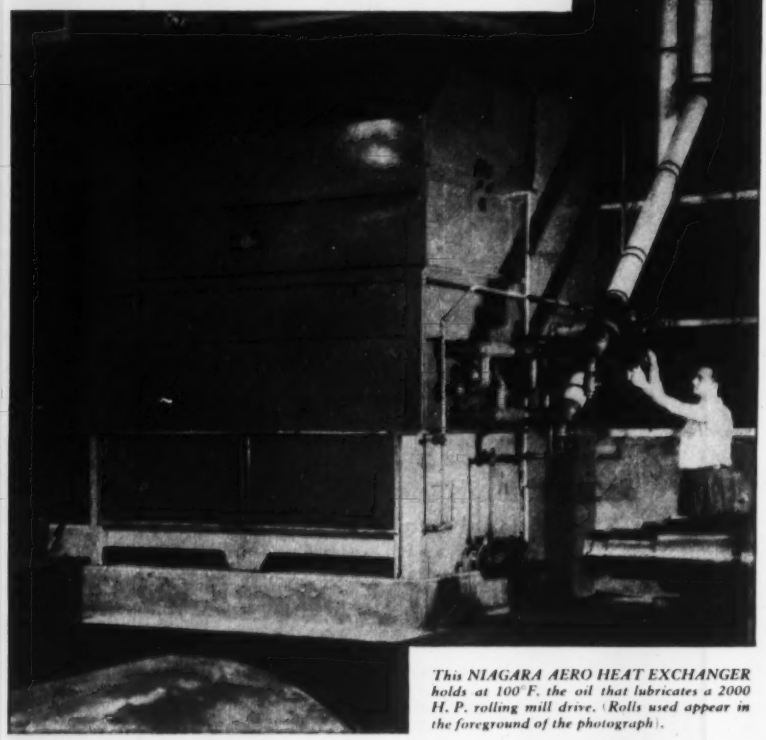
In-plant survey to scientifically determine your fire protection needs.

Call the Ansul Man!

ANSUL

Get in touch with your local Ansul man through the "yellow pages" or write ANSUL CHEMICAL COMPANY, Fire Equipment Div., Dept. F-133, Marinette, Wisconsin.

YOU CAN KEEP ACCURATE CONTROL OF LUBE OIL TEMPERATURE



This NIAGARA AERO HEAT EXCHANGER holds at 100° F. the oil that lubricates a 2000 H. P. rolling mill drive. (Rolls used appear in the foreground of the photograph).

The Niagara Aero Heat Exchanger uses atmospheric air to cool liquids and gases by evaporative cooling, removing the heat at the rate of input, controlling temperatures precisely. You save 95% of the cost of cooling water. You get great saving in piping, pumping and power, quickly getting back the cost of the installation.

You can cool and hold accurately the temperature of all fluids, air and gases, water, oils, solutions, chemicals for processes and coolants for mechanical and electrical equipment. You can cool welding machines, hydraulic and extrusion presses, plastic molds, furnaces, controlled atmospheres, quench baths, obtaining better results with precise temperature. You obtain closed system cooling, free from dirt or scale.

For further information, write for Bulletin No. 120

NIAGARA BLOWER COMPANY

Dept. S , 405 Lexington Ave. New York 17, N. Y.

Niagara District Engineers in Principal Cities of United States and Canada

LETTERS

(Concluded from page 10)

tainly keep our readers abreast of new developments.—ED.

Moly Can Be Found

Would you kindly send us the names of manufacturing concerns producing high-alloyed or 100 per cent molybdenum bars or rod in diameters of approximately 5/8 in.?

Please omit Climax Molybdenum Co., Westinghouse Electric Corp. and Fansteel Metallurgical Corp., as we are presently familiar with those operations.

Edwin R. Miller
sales engineer
General Engineering & Design Co.
Berkley, Mich.

• *The following companies produce molybdenum rod: Elmet Division, North American Philips Co. Inc., Lewiston, Me.; American Tungsten Mfg. Corp., Lakewood, N. J.; Alton Co. Inc., Union City, N. J.; and Cleveland Tungsten Inc., 10201 Meech Ave., Cleveland.—ED.*

Revealing Steel's Secrets

Please send me a tear sheet of the article on p. 150 of the Oct. 25 issue, "Adding Lead to Steel . . . Here's How It's Done" (. . . for the first time, details of the process are revealed.).

William J. Resch
metallurgist
Pilgrim Drawn Steel Division
Automotive Materials Corp.
Plymouth, Mich.

I would appreciate five copies . . .

G. C. Hill
assistant manager of sales
District Sales Office
U. S. Steel Corp.
Indianapolis

Please forward three copies . . .

G. F. Powell
Steel Co. of Canada Ltd.
Hamilton, Ont.

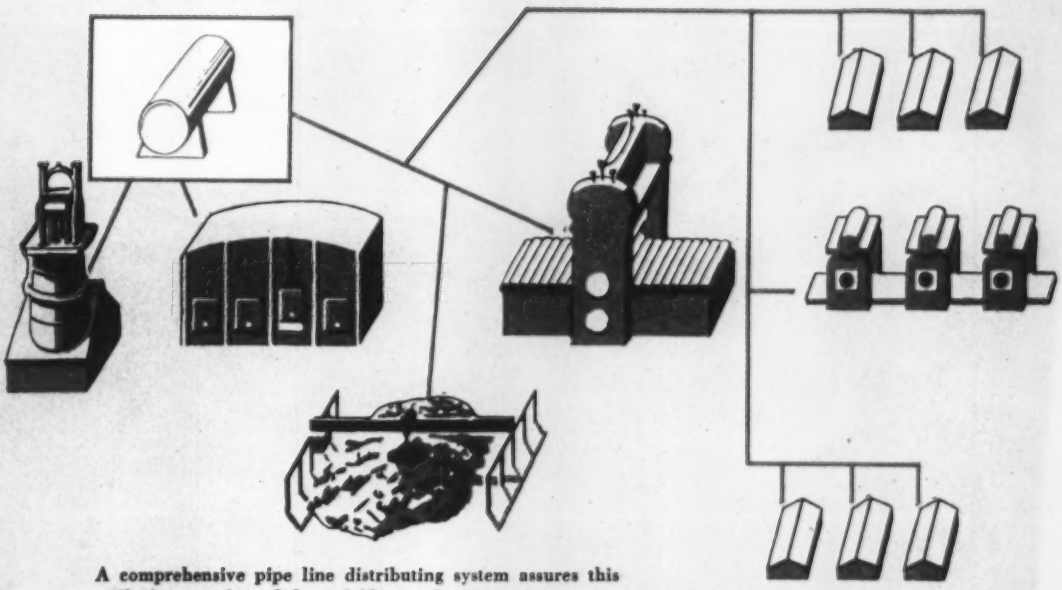
Please send me two tear sheets . . .

E. P. Beachum
assistant metallurgical engineer
Bethlehem Steel Co.
Bethlehem, Pa.

We'd appreciate receiving several tear sheets . . .

William R. Short
superintendent
Hoyt Plant
National Lead Co.
Granite City, Ill.

How LINDE SERVICE* HELPED A STEEL MILL SOLVE AN OXYGEN SUPPLY PROBLEM



A comprehensive pipe line distributing system assures this mill of an ample and dependable supply of oxygen at every point where it is needed.

A major steel mill reached the point where it was necessary to expand its oxygen facilities. At various points along the production line, oxygen was being more widely used. How could they best insure having oxygen available at all of these points, when needed, and in the amounts needed?

LINDE was called in to study the situation. Working with mill people, LINDE service engineers designed and supervised the expansion of a comprehensive oxygen and acetylene system that would serve the requirements of the entire mill.

A network of pipe lines carries oxygen from a DRIOX Liquid Oxygen unit to every major point where it is needed. The lines range from standard sizes for general use to special 6-inch lines that supply open-hearth shops with furnace oxygen.

This system has provided the mill with a dependable, flexible, and economical supply of oxygen. It has resulted in substantial labor savings and more efficient use of oxygen, since the oxygen supply is determined by the mill's needs, even under widely fluctuating demands. The mill pays only for what it uses.

***LINDE SERVICE** is the unique combination of research, engineering, and more than 40 years of accumulated know-how that is helping LINDE customers save money and improve production in their use of oxygen and oxy-acetylene processes.

If your company uses oxygen, LINDE SERVICE can mean dollar savings to you. Let us tell you more about it.

LINDE AIR PRODUCTS COMPANY
A Division of UNION CARBIDE AND CARBON CORPORATION
30 East 42nd Street UCC New York 17, N. Y.
Offices in Principal Cities
In Canada: Dominion Oxygen Company
Division of UNION CARBIDE CANADA LIMITED

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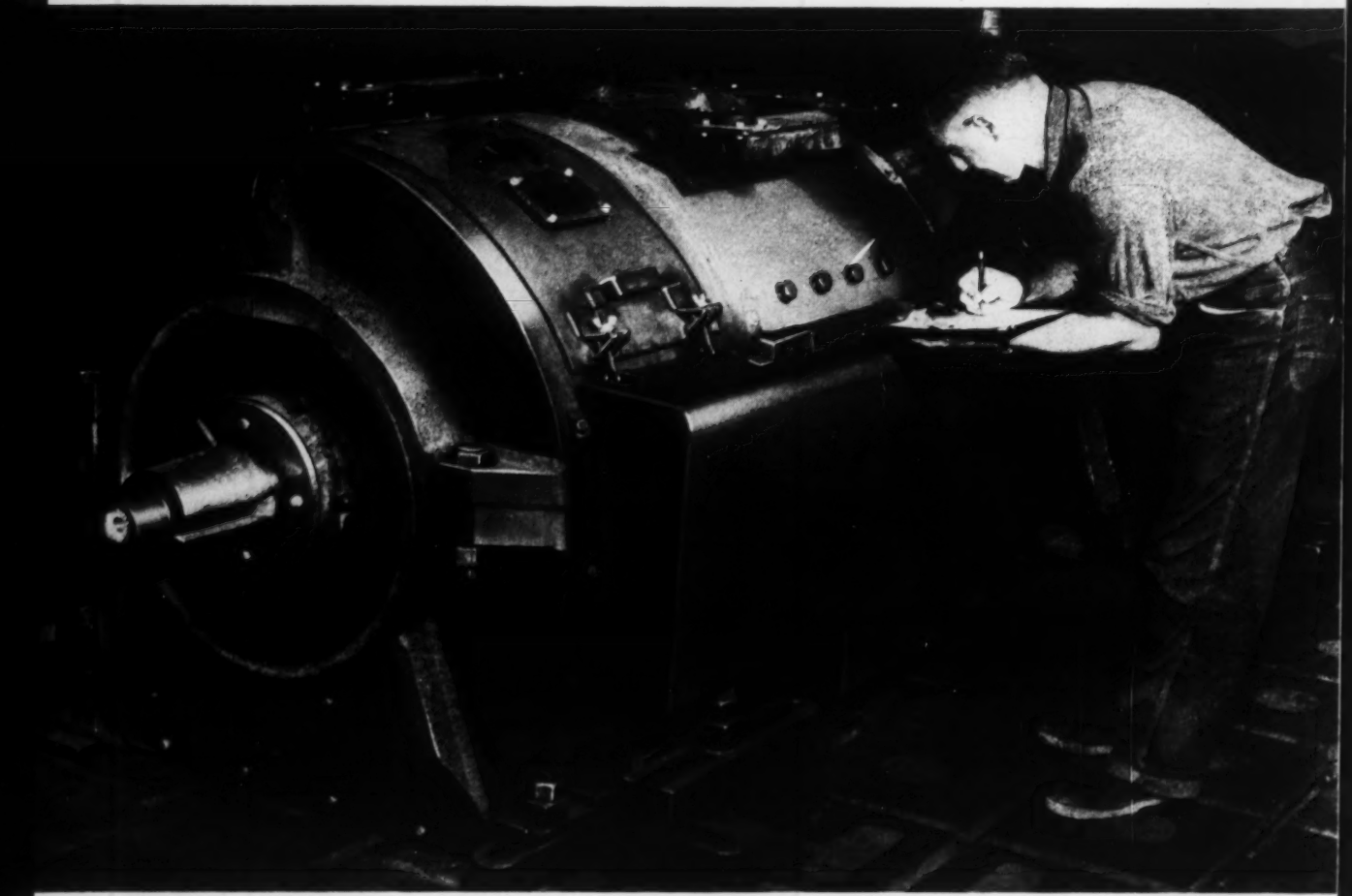
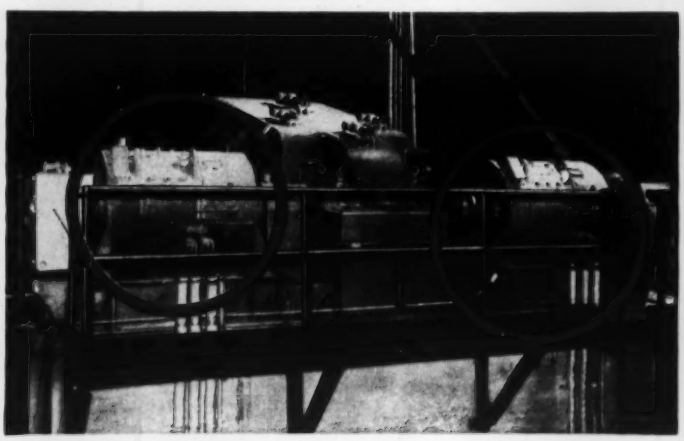
Trade-Mark

NEW G-E Armored Mill Motor—



TO ASSURE YOU of dependable service, this MD-622 is undergoing the rigid tests given to all G-E Armored Motors before shipment.

POWER SHOVEL equipped with compact G-E Type MD motors which have high overload capacity and the ability to take the terrific shocks of excavating duty.



SLAB SHEAR in reversing, blooming and slabbing mill is typical of severe applications in the steel industry that are dependably powered by G-E armored motors.

Most Powerful in its Class

Another G-E "first"—the MD-622—gives you more horsepower and torque than any other mill motor!

POWER-PLUS for the toughest heavy-duty application—that's the job of the MD-622—General Electric's latest addition to the MD-600 Armored Motor line.

AISE OBJECTIVES set up for smaller motors of this type, are met in the construction of the MD-622, which gives you more horsepower, increased commutating ability and better speed regulation in the same mounting dimensions as the earlier motor. Designed for duty in steel mills, power shovels, mine operations, dredges and ore bridges, it's ideal for extra torque, high momentary loads and snappy reversals.

RATED 500 HP AT 350 RPM when force ventilated, this motor delivers more torque relative to its size than any other mill motor ever built.

BETTER SPEED REGULATION can be maintained at higher speeds than in previous motors—and maximum safe speed is 20% higher.

WIDER SPEED RANGE is possible with the adjustable speed MD-622 and stabilizing series windings are not required, simplifying control on reversing operations.

REDUCED MAINTENANCE due to integral feet on armature. Out of frame, it stands by itself. Armature spider allows replacement of shaft without disturbing windings.

FOR NEW BULLETIN on MD-600 motors, fill out the coupon below. If you need more information, contact your nearest G-E Apparatus Sales Office. General Electric Co., Schenectady 5, N. Y.

Please send Bulletin GEA-4654C, "DC Armored Motors," which gives the complete story on the MD-600 line with examples of their reliable performance throughout industry.

General Electric Co.
Section G810-3
Schenectady, N. Y.

☐ Planning an immediate project.
☐ For reference only.

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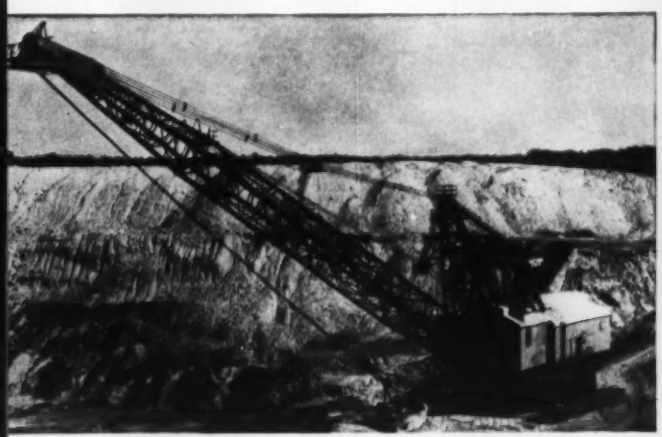
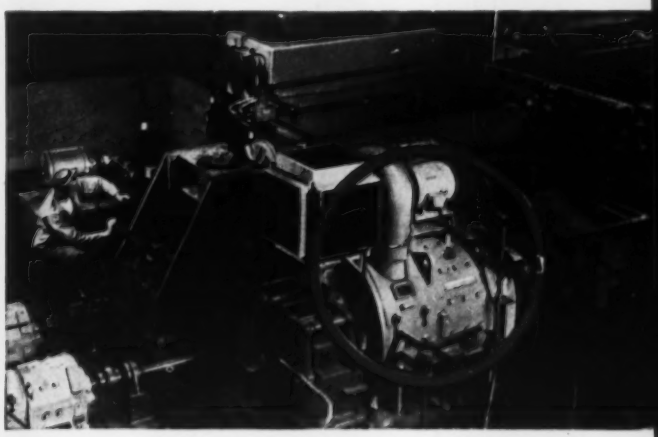
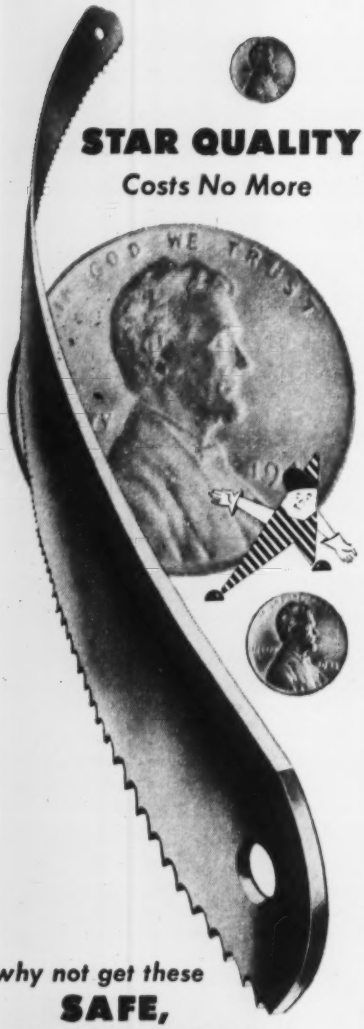


DRAGLINE powered by amplidyne-controlled G-E armored motors—which were selected because of their high torque and quick reversing characteristics.



COILER in hot strip mill driven by force ventilated G-E armored motor with extra horsepower and mechanical strength to withstand severe operating conditions.



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why not get these
SAFE, UNBREAKABLE
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For over 75 years, industry has *known* STAR Hand and Power Hacksaw Blades as *quality* blades.

Here, as an example, is the STAR Unbreakable High Speed Steel Blade—safe, fast-cutting, long-lived. The STAR combination of a flexible steel back, special-process weld and high speed steel cutting edge adds up to an efficient, shatterproof, proved-quality blade.

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Order any of the complete line of STAR Blades from your Industrial Distributor—your best source of supply for hundreds of the items you need to operate efficiently, economically, and without production interruptions. 1016

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FREE-MACHINING PLATE Steel

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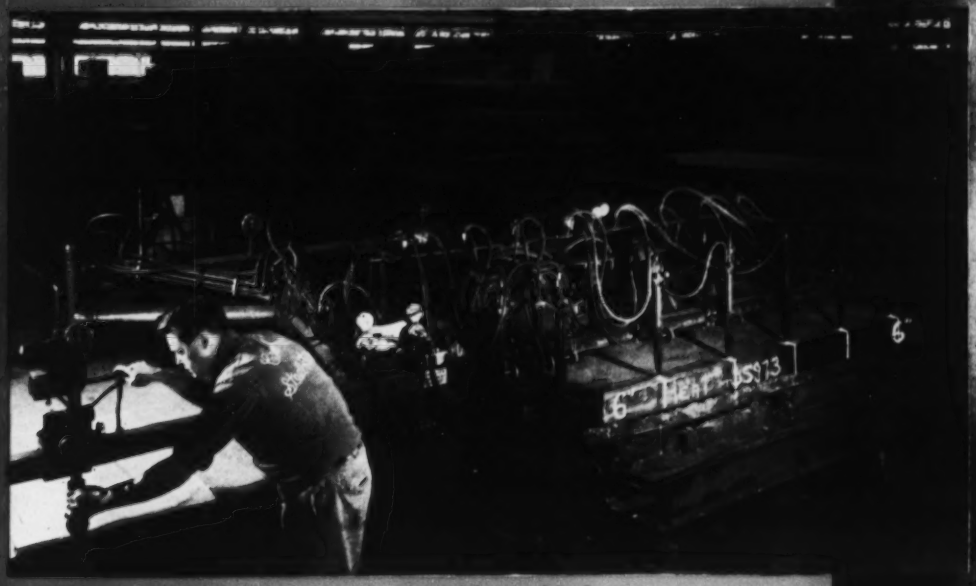

Readily welded
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Increased machinability gives

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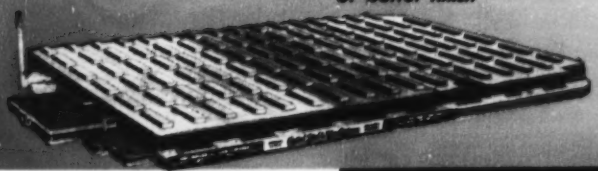

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BULLARD

The Invisible Background of Industrial Progress

Since the driving of the Golden Spike on May 10, 1869, linking the Central Pacific and Union Pacific Railroads, this mode of travel has been the lifeline of our commercial and industrial activities.

Railroads have kept pace with the needs of the nation by promoting more modern equipment and methods. Today's streamlined Diesels speed over the rails replacing steam locomotives. De luxe coach and Pullman cars, unknown a few years ago, now provide greater conveniences and luxuries for the traveler.

Railroads and manufacturers of railroad equipment have long recognized the importance of *Modern Machine Tools* in the efficient production of their products — evidence of "The Invisible Background of Industrial Progress."

THE BULLARD COMPANY

Bullard Mult-Au-Matic

Type "K"–Available with
6 Spindles, 6 Twin Spindles,
8 Spindles and 8 Twin Spindles

The "Mult-Au-Matic Method" has gained acceptance throughout industry as a manufacturing method that has contributed greatly to the economic production system.

The Type "K" Mult-Au-Matic is engineered and built to increase the scope of the "Mult-Au-Matic Method" by reducing production costs on the small and medium-size jobs. Here are some of its features:

High spindle speeds
Independent and variable feeds for each tool head
Positive feed stops assure work accuracy
Power-operated chucking maintains cycle time
Twin spindle application for high production
Minimum floor space in relation to productive capacity.

These features can provide increased efficiency to your machining problems. A Bullard Sales Engineer will be pleased to discuss them with you. Reach him by calling the nearest Bullard Sales Office or write to The Bullard Company, Bridgeport 2, Connecticut — phone EDison 6-2511.

BRIDGEPORT 2, CONNECTICUT

"Scrap and Pig for the Furnaces." Agnes Potter Lowrie depicts a variety of objects which will emerge Phoenix-like from the flames of the open hearth to new life as virgin steel: buck-toothed gears, a section of track, machine shop shavings, old tubing, stampings and, bulking equally large, rusty red pig. Limited edition of 15 x 18 color prints. Copy on request.

The Fine Art of Steel Making #II

In sharp contrast to many industries, the basic ingredients of steel making have changed little, if any, over the years. How then has steel been able to spearhead America's industrial growth? How has it been able to produce more steel, better quality steel year by year?

Because steel men have worked constantly to improve the *mechanics* of steel making, as well as the metallurgy. And because steel's suppliers have parallelled every such improvement with an equal advance of their own.

Consider the materials which smooth the process of steel making — Ironsides Gear Shield lubricants. Heavy Gear Shield, once hand-paddled onto exposed gears, is now formulated with a solvent for quick spray application.

For encased gears, Gear Shield was produced in liquid form for pouring, pumping or timed-jet application. Later Ironsides was among the leaders in developing extreme pressure lubricants.

Today, so widespread is the acceptance of Ironsides lubricants that other makers have attempted to refer to their own products as "gear shield", even though Gear Shield is an Ironsides trade mark.

Ironsides is not mass production. We are the "Custom Tailors" of lubrication. Our special position is due in large part to our flexibility. We can — and do — formulate for individual applications and supply these formulas in any quantity from pails to tank cars.

We like tough problems; we've solved a lot of them. For example, Palmoshield, replacement for palm oil and most important advance in lubrication since World War II. If you have a problem, we'd like to help lick it. A letter will summon one of our research engineers. The Ironsides Co., Columbus 16, Ohio.

SHIELD PRODUCTS

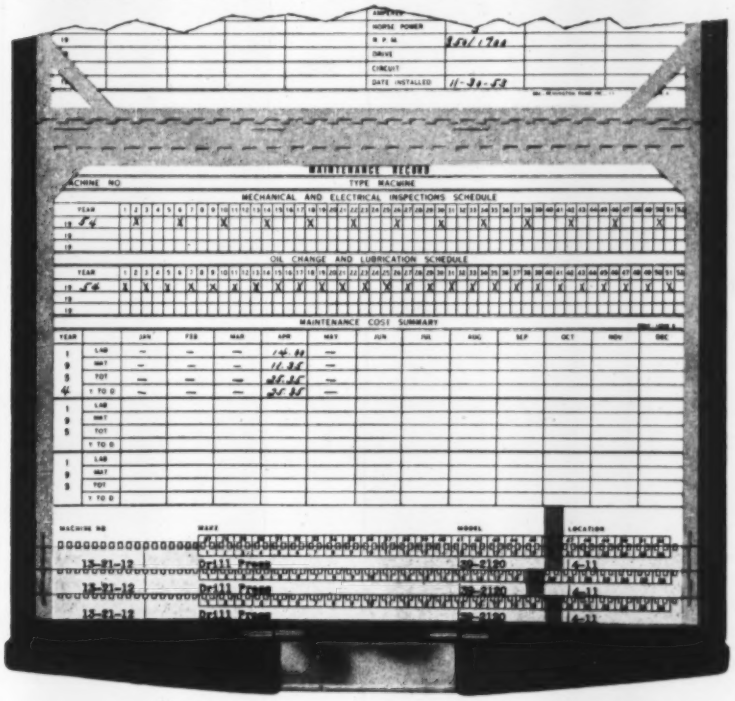
Ironsides

By the makers of Palmoshield • "the palm tree that grows in Ohio"

Remington Rand

BETTER BUSINESS METHODS

For Greater Profits Through Lower Costs



Integrated Preventive Maintenance Program Protects Capital Investment, Cuts Down-time and Product Costs

A well-integrated Preventive Maintenance Program will include: Equipment Records, Maintenance Parts Control, Written Work Orders, Work Scheduling and Executive Reports.

A Kardex Equipment Record (partially illustrated above) gives a complete machine history, at a glance. This record includes a history of depreciation, mechanical and electrical inspections, oil change and lubrication, plus a *maintenance cost summary*, to aid management decisions on machine replacement or retirement.

Written Work Orders are essential for planning job assignments and for correct cost accounting. They alert maintenance executives to all conditions affecting work to be performed, put an end to the errors and misunderstandings that result from verbal orders.

Your *integrated* system will aid in the preparation of Executive Reports. Here, visibly-signalled Kardex records have proved to be most efficient. More details on this phase, and on the entire Maintenance Control System, are yours in booklet X1383, offered in the coupon.

Tight Maintenance Parts Control Helps Reduce Inventory Investment, Production Stoppage, Overtime

With tight control over parts and supplies, scheduled maintenance and necessary repairs are expedited; production stoppage and overtime are held to a minimum. Maintenance parts records should list available balances on hand, usage and trend of usage, vendors, date and quantity of last order. Effective control includes a numbering system to eliminate duplicate items, cut inventory investment. Kardex Visible records, with movable Graph-A-Matic signals, save time by focusing attention on items nearing reorder point. See booklet X1383.

Sched-U-Graph Controls Maintenance Force Workload for Proper Job Sequence; Minimizes Lost Man-hours

To be effective, any preventive maintenance system will *plan* the workload for each member of the maintenance crew. The ideal method of workload scheduling is the *visible* method; the ideal visible tool for the job is the Remington Rand Sched-U-Graph.

Sched-U-Graph assures handling of maintenance jobs in proper sequence, for minimum interference with production. Sched-U-Graph tells the foreman, at a glance, what job each worker is on and how long

it should take, or, if he is free for immediate assignment. Result: Increased efficiency on the part of each worker, higher output, less waste. Further details on visible scheduling with Sched-U-Graph are contained in booklet X1383. Send for your free copy today.

Remington Rand

Room 2186, 315 Fourth Ave., New York 10

Yes, I'd like to have Booklet X1383.

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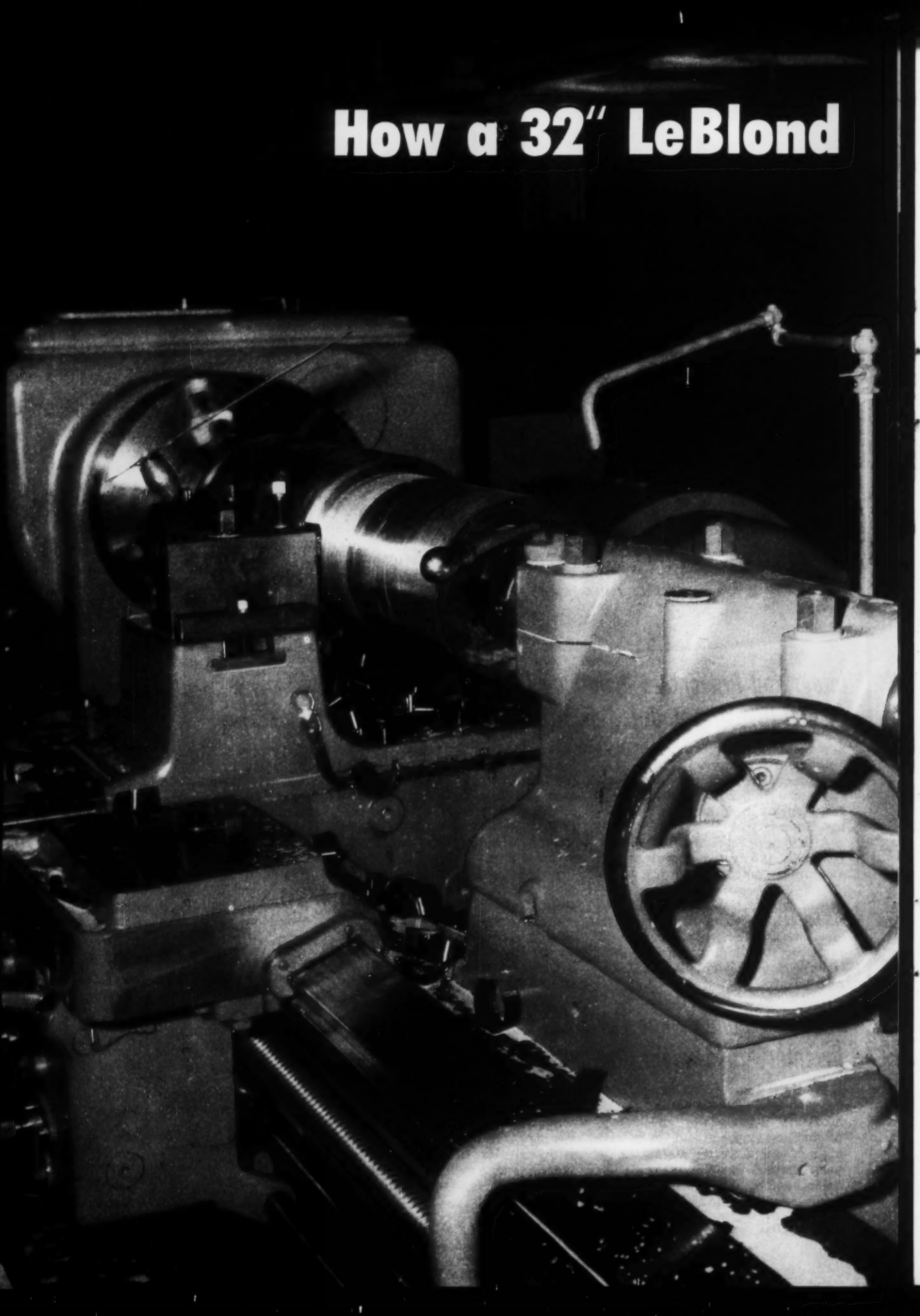
--- Profit-Building **IDEAS** For Business ---

How a 32" LeBlond



takes a measured 118-HP cut

Wanted. *A 32″ lathe to stand up under 100-plus horsepower cuts. Must also provide unusually-wide range of feeds and infinitely-variable speeds.*

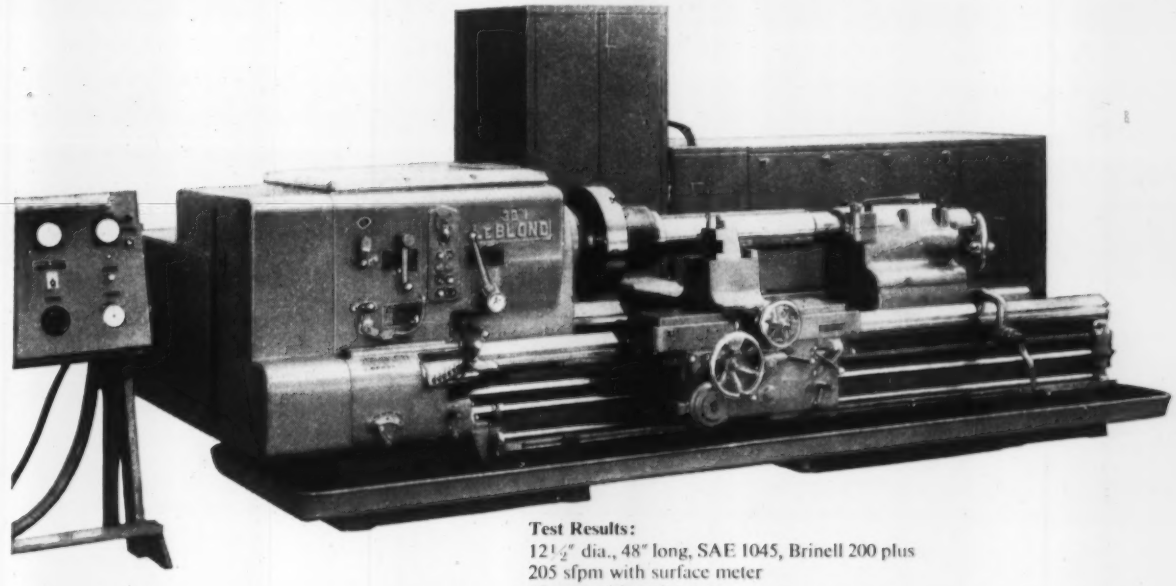
No standard model could fill these requirements. But our new 32″ Heavy Duty had the ruggedness that was needed. We made some changes, mainly in the headstock, and produced a 32″ lathe with these specifications:

Drive; 125 hp, variable speed.

Speeds; infinite from 42 to 1400 rpm.

Feeds; 56 from .002 to .250 ipr.

Plus these features that are standard on our 25″ and 32″ lathes: 4-directional power rapid traverse built into apron; one-piece double-wall apron, hardened rack; totally-enclosed quick-change box; hardened and ground replaceable steel bed ways; thrust-lock tailstock.



Test Results:
12½″ dia., 48″ long, SAE 1045, Brinell 200 plus
205 sfpm with surface meter
63 rpm with tachometer
.083″ feed per rev.
1″ depth of cut
2 hp reading on meter before cut
120 hp reading on meter during cut
118 net hp at the cut

This lathe, with variations to suit your needs, is now available. It appears to be well-suited to very high production turning of large forged or cast-steel shafts and rolls. For quotations against your specifications, get in touch with the nearest LeBlond Distributor or write Cincinnati direct.

....cut with confidence

LeBLOND *of Cincinnati*

THE R. K. LEBLOND MACHINE TOOL COMPANY, CINCINNATI 8, OHIO

WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • *FOR MORE THAN 67 YEARS.*

Announcing...

ELECTROLYTIC MANGANESE

99.9% PURE

Now available from ELECTROMET in tonnage quantities. For all uses where a high purity manganese is required, including:

- *Low-Carbon Stainless Steels*
- *High-Temperature Alloys*
- *Non-Ferrous Alloys*
- *Electrical Resistance Alloys*

Electrolytic manganese is now being produced in tonnage quantities at ELECTROMET's new Marietta, Ohio, plant. ELECTROMET's new manufacturing process produces manganese of very high purity with 99.9 per cent minimum manganese.

Additional information about electrolytic manganese and other ELECTROMET ferro-alloys and metals will be gladly furnished on request. The ELECTROMET office in your area will be pleased to answer your inquiry.

The term "Electromet" is a registered trade-mark of Union Carbide and Carbon Corporation.

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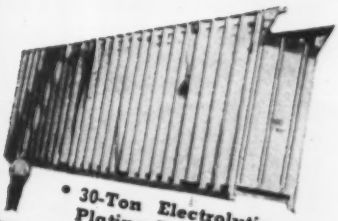
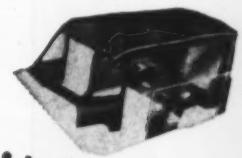
Electromet
TRADE MARK
Ferro-Alloys and Metals

• Roll Tables for Steel Mill



• 30-Ton Electrolytic Plating Tank

• Control House for Steel Mill



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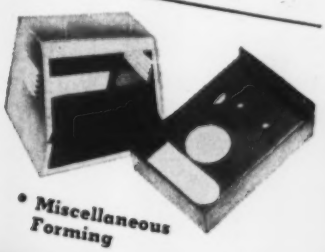


• Miscellaneous Forming

do it...

on a versatile, accurate

Cincinnati Press Brake

Illustrations courtesy of Charles T. Brandt, Inc.

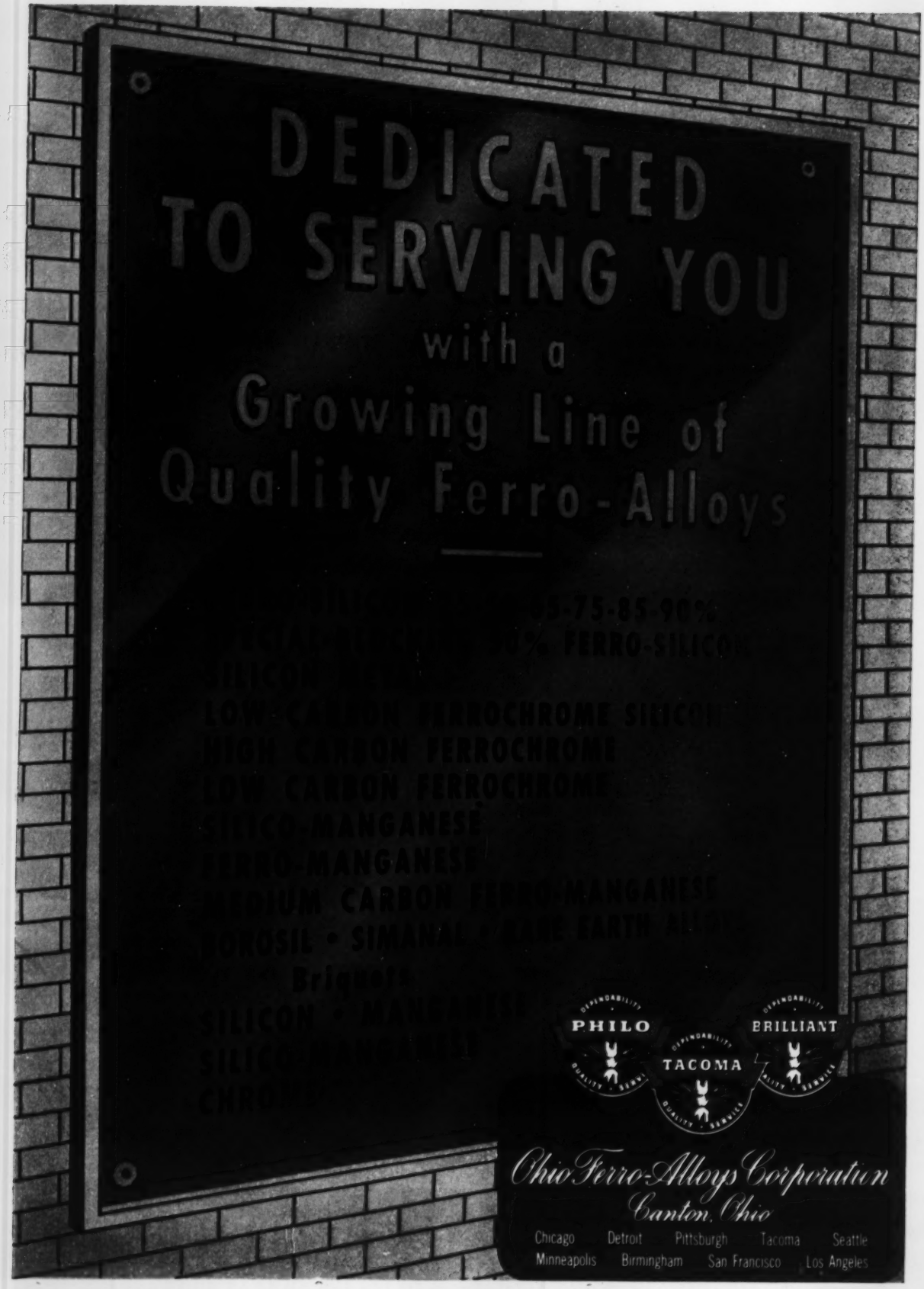
At Charles T. Brandt, Inc. speed, accuracy, and versatility are necessary to take care of large or small work in jobbing or production quantities.

Write for the New 72 Page Catalog B-4, describing operations, features, and special arrangements including wide beds and rams, bed and ram extensions, deeper gaps, higher die space and other features.

CINCINNATI

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES


DEDICATED
TO SERVING YOU
with a
Growing Line of
Quality Ferro-Alloys
PHILO
TACOMA
BRILLIANT
Ohio Ferro-Alloys Corporation
Canton, Ohio
Chicago Detroit Pittsburgh Tacoma Seattle
Minneapolis Birmingham San Francisco Los Angeles

CALENDAR
OF MEETINGS

November 15-17, Association of American Battery Manufacturers Inc.: Annual meeting, Edgewater Beach hotel, Chicago. Association address: 70 Cherry St., Akron, O. Secretary: V. L. Smithers.

November 15-17, American Standards Association: Fifth national standardization conference, Hotel Roosevelt, New York. Association address: 70 E. 45th St., New York. Managing director: Admiral G. F. Hussey.

November 15-17, Magnesium Association: Annual meeting, Chase-Park Plaza hotel, St. Louis. Association address: 122 E. 42nd St., New York 17. Executive secretary: Jerry Singleton.

November 18, National Industrial Conference Board Inc.: General session for all associates, Conrad Hilton hotel, Chicago. Board address: 247 Park Ave., New York 17. Secretary: Herbert S. Briggs.

November 18-19, American Management Association: Special conference on supervision, Hotel Biltmore, New York. Association address: 330 W. 42nd St., New York 36. Vice president-secretary: James O. Rice.

November 18-19, American Society for Quality Control: Midwest conference, Baker hotel, Dallas. Information: D. B. Tallon, Chairman, 4220 Patricia St., Fort Worth, Tex.

November 18-19, American Zinc Institute Inc.: Fall meeting, Galvanizers Committee, William Penn hotel, Pittsburgh. Institute address: 60 E. 42nd St., New York 17. Secretary-treasurer: E. V. Gent.

November 18-19, National Constructors Association: Fall meeting, International House, New Orleans. Association address: 50 E. 41st St., New York. Secretary: C. B. Bronson.

November 23-December 3, American Society of Mechanical Engineers: Annual meeting, Statler hotel, New York. Society address: 29 W. 39th St., New York. Secretary: C. E. Davies.

November 29-December 2, First International Automation Exposition: 244th Regiment Artillery Armory, New York. Information: Richard Rimbach, 845 Ridge Ave., Pittsburgh 12.

December 1-3, American Institute of Mining & Metallurgical Engineers: Electric furnace steel conference, William Penn hotel, Pittsburgh. Institute address: 29 W. 39th St., New York 18. Secretary: E. H. Roble.

December 1-3, National Association of Manufacturers: Annual meeting, Waldorf-Astoria, New York. Association address: 2 E. 48th St., New York. Secretary: Noel Sargent.

December 2-7, National Exposition of Power & Mechanical Engineering, Commerical Museum, Philadelphia. Information: International Exposition Co., 480 Lexington Ave., New York 17. Manager: E. K. Stevens.

December 5-7, National Association of Aluminum Distributors: Annual meeting, Boca Raton hotel and club, Boca Raton, Fla. Association address: 1900 Arch St., Philadelphia 3. Secretary: R. B. Wall.

December 5-9, Scientific Apparatus Makers Association: Fall meeting, Pinehurst hotel, Pinehurst, N. C. Association address: 20 N. Wacker Dr., Chicago. Executive vice president: Kenneth Andersen.

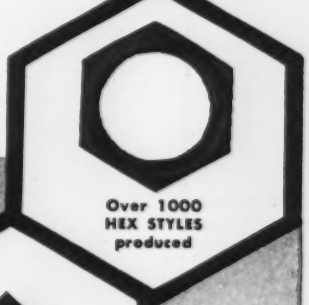
December 12-15, American Institute of Chemical Engineers: Annual meeting, Hotel Statler, New York. Institute address: 120 E. 41st St., New York 17. Secretary: Stephen L. Tyler.

December 13-14, Material Handling Institute Inc.: Annual meeting Statler hotel, New York. Institute address: 813 Clark Bldg., Pittsburgh 22. Managing director: R. Kennedy Hanson.

December 14-15, Industrial Truck Association: Annual meeting, Hotel Statler, New York. Association address: 526 Washington Loan & Trust Bldg., Washington 4. Secretary: William Van C. Brandt.

January 5-7, Institute of Scrap Iron & Steel Inc.: Annual convention, Saxony, San Souci, Sea Isle hotels, Miami Beach, Fla. Institute address: 1729 H St., N. W., Washington 6. Executive vice president: Edwin C. Barringer.

There are over 1,500 chances



Fischer has your SPECIAL SIZE in REGULAR production

If it isn't, FISCHER WILL CUSTOM PRODUCE IT at a price far below your present cost!

OVER 140 THREAD SIZES!

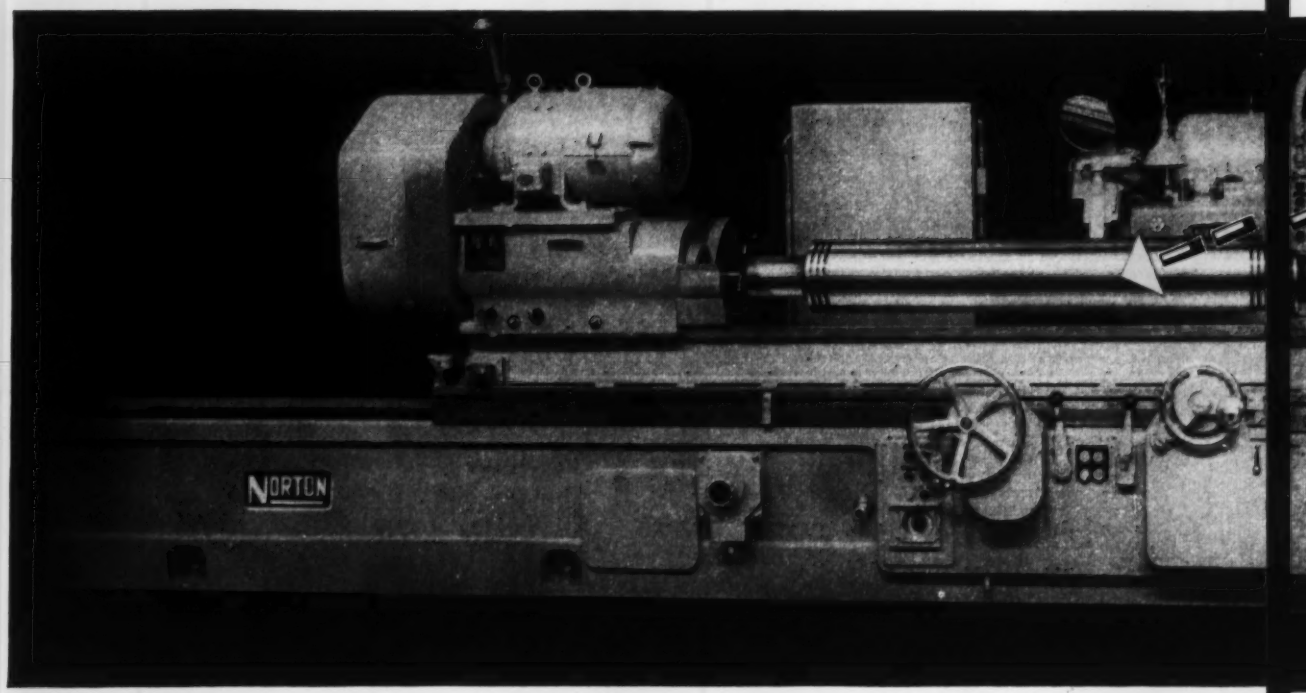
"Fischer Turned" BRASS NUTS

CHECK FISCHER! Find out if your special isn't a "standard". You'll find it pays! For either way, regular or custom production, you can't match the **HIGH PRECISION, LOW PRICE** and **POSITIVE DELIVERY** of "Fischer Turned" Brass Nuts. Our prices and samples will prove it. Send today!

Fischer SPECIAL MFG. CO.
446 Morgan St., Cincinnati 6, Ohio

Western Union—TFI-BELL SYSTEM TELETYPEWRITER CI-448-U.
TELEPHONE Woodburn 1280

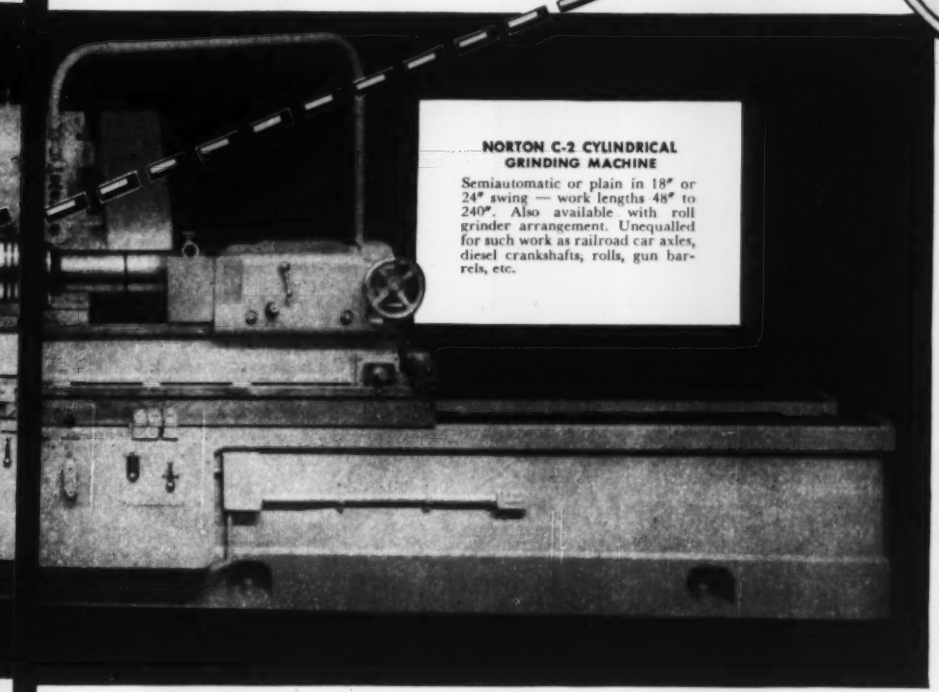
Here's a heavy duty grinder



Easy To Set Up And Operate. All controls in front for minimum set-up time, quick change-over and no reaching by operator. Graduated wheel hand feed indicates feed. "Click-counter" signals adjustment for each .0001" reduction in work diameter. Table-truing and grinding speeds may be pre-set, and obtained by selector lever.

Easy To Maintain. All maintenance points on outside. Pumps, motors, filters, lubrication valves and all reservoirs easily accessible. Electrical controls grouped for easy inspection and enclosed for protection.

that can produce *bigger profits for you*


NORTON C-2 CYLINDRICAL GRINDING MACHINE
Semiautomatic or plain in 18" or 24" swing — work lengths 48" to 240". Also available with roll grinder arrangement. Unequalled for such work as railroad car axles, diesel crankshafts, rolls, gun barrels, etc.

The new Norton C-2 Cylindrical Grinder is available in 3 arrangements: Plain Semiautomatic Roll

Faster cutting . . . quicker set-up . . . easier operation . . . less down time

This is the kind of grinding machine you expect from Norton — one that's tops for accuracy, production rate and ease of operation.

The new C-2 gives you more heavy production because it works more of the time — and works faster and easier.

When arranged for Semiautomatic operation all your operator does is to move a single lever for automatic grinding to exact size and finish.

When arranged as a Roll Grinder the famous Norton tilting wheel head mechanism is supplied. This moves the grinding wheel contact point away from or toward the axis of the roll as the roll is traversed past the wheel face.

Remember: only Norton offers you such long experience in both grinding wheels and machines, to help you produce more at lower cost.

Your Norton Representative will be glad to give you all the facts on the new C-2 and to discuss your grinding problems. Or write direct to NORTON COMPANY, Machine Division, Worcester 6, Mass.

***To Economize, Modernize With* NEW**

NORTON

GRINDERS and LAPPERS

Making better products . . . to make other products better

District Sales Offices: Worcester • Hartford • New York (Teterboro, N. J.) Cleveland • Chicago • Detroit
In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5

It's easy to

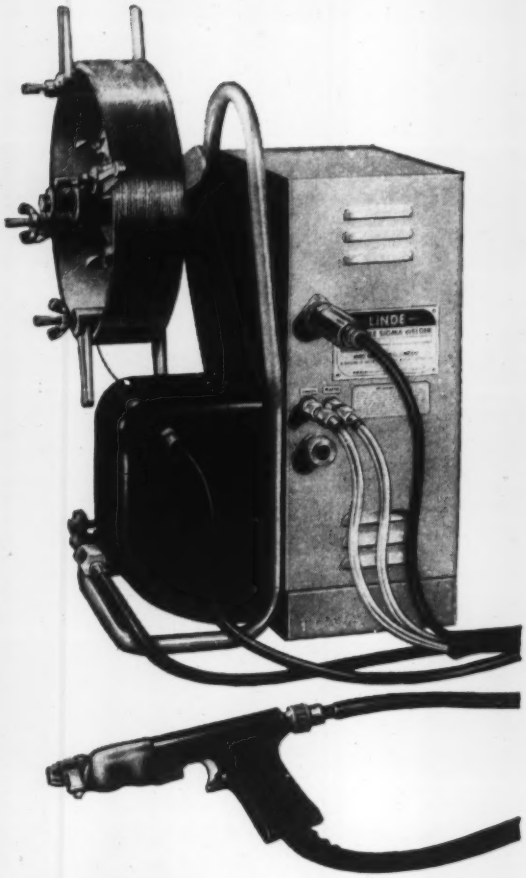
CUT WELDING COSTS

when you use a High-Speed

LINDE SWM-2

Trade-Mark

Portable Sigma Welder



Your welding department can easily make high-speed, low-cost fusion welds in aluminum, stainless steel, high temperature alloys, copper, carbon steel, and other metals with the LINDE SWM-2 Portable Sigma Welder. The LINDE SWM-2 is a complete control unit for manual sigma (Shielded Inert Gas Metal Arc) welding operations. It mechanically feeds welding wire from a coil into the weld area at a steady precontrolled rate and supplies a regulated quantity of argon to shield the weld from contamination by the atmosphere. No flux is used. In most cases the smooth, clean sigma welds need no post-welding treatment.

SIMPLIFIED AUTOMATIC OPERATION

The operator merely presses the trigger of the pistol type torch to energize the control circuit and start the flow of water coolant and argon gas. When an arc is struck by touching the consumable electrode to the workpiece, the wire feed automatically begins.

NEW CONSTANT POTENTIAL POWER SUPPLIES CAN BE USED

Either ordinary or constant potential DC power supplies can be used with a LINDE SWM-2. In constant potential welding arc voltages are preselected and held with outstanding consistency which permits positive starts and high-speed welds on thin metals.

Call your nearest LINDE office today for more information on how you can cut production welding costs with the LINDE SWM-2 Sigma (Shielded Inert Gas Metal Arc) Welder. Or write for your free LINDE SWM-2 catalog.

Production jumped 300% when the Heller Engineering and Manufacturing Company, Lynwood, California changed to sigma welding to fabricate aluminum engine shipping stands. Because the sigma welds were clean and sound, post-welding treatment was practically eliminated.

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

Offices in Other Principal Cities

In Canada: DOMINION OXYGEN COMPANY

Division of Union Carbide Canada Limited, Toronto

The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.

Linde

Trade-Mark

. . . will roll foil from .00035" at speeds up to 4000 fpm

depending upon gauge thickness

To roll out thin sheets of aluminum at speeds up to 4000 feet per minute has taxed the ingenuity of the finest rolling mill engineers. But there are now over one hundred modern Lewis Foil Mills in operation, such as the 9" and 21" x 44" units shown in the illustration.

These mills generally start with .030" or .026" sheet . . . and for standard gauge foil reduce it to .00035" . . . at speeds ranging from 1000 to 4000 feet per minute.

Built in various sizes and widths to meet individual customer's requirements, these Lewis Foil Mills include the latest design in bearings, electric tension control and thermal control.

The thermal control is the key to successful operation and high production in foil rolling. It permits rolling of very thin metal at lower maximum tension and the production of full coils, evenly balanced in tension . . . which reduces breakage to a minimum. Coils from 3000 to 3500 pounds are being rolled.

Most of the mills are used for rolling aluminum foil, but they are equally adaptable for rolling all metals of light gauges. So if you have a problem in rolling thin metals, we'll be glad to give you complete information on the design and specifications of Lewis four-high Foil Mills . . . which can be built to your requirements.

In fact, if you have any problem involving rolling mill machinery, our experienced engineers and modern manufacturing facilities are always available.

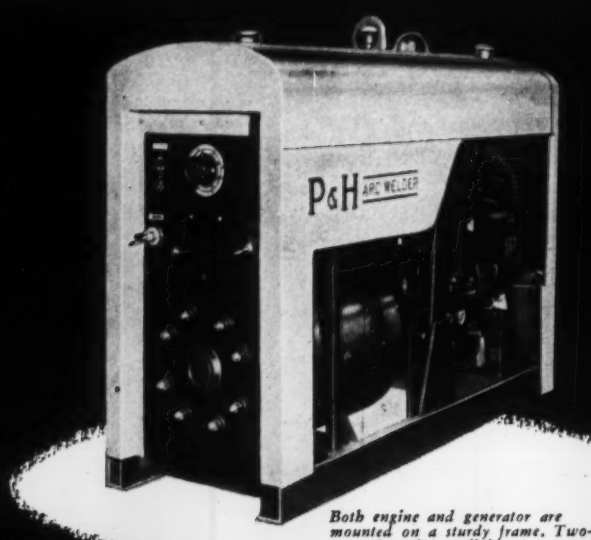
LEWIS four-high FOIL MILL

BLAW-KNOX COMPANY • LEWIS MACHINERY DIVISION
PITTSBURGH 22, PENNSYLVANIA

BLAW-KNOX

LEWIS PRODUCTS: Two-High Mills • Three-High Mills • Four-High Mills • Bar, Billet and Structural Mills
Rod Mills • Coilers • Tables • Shears • Levelers • Pinion Stands • Gear Drives • Roll Lathes • Flaking Mills

NEMA-rated at 200 amps.
—but pulls 300 amps.!
Runs all day on one tank of gas!



Both engine and generator are mounted on a sturdy frame. Two-wheel mounting also available.

New P&H WN-250 Engine-Driven Arc Welder

Here you get everything you've ever wanted in an engine-driven welder — including cost-cutting features you don't get from any other:

(1) The P&H WN-250 has more capacity than other welders with the same rating.

(2) It has a full 20-gallon gas tank.

(3) It is powered by a direct-connected 180GLU Waukesha gasoline engine, water-cooled and built for heavy duty. Not an automotive light-weight. Available with electric starter.

(4) P&H idling device establishes the rated speed of 1800 rpm as soon as the arc is struck. This speed is maintained for a set period after the arc is broken.

(5) P&H Dial-lectric Control provides stepless heat adjustment over the entire high or low range.

(6) It has pre-lubricated bearings, to reduce the need for servicing and insure longer life.

(7) Auxiliary AC power supply (1KVA) permits floodlighting and running power tools.

You're money ahead with a P&H WN-250. Ask your P&H representative or distributor for all the facts. Or, write for bulletin.

P&H WELDING DIVISION
HARNISCHFEGER CORPORATION
4411 West National Avenue
MILWAUKEE 46, WISCONSIN

Continuous 8-hour welding test demonstrates the extra stamina of the P & H WN-250

You can't beat welding performance like this: In a recent test, the P&H WN-250 operated continuously for 8 hours on a 70% duty cycle.

A $\frac{5}{32}$" electrode was used with 300 feet of cable. There were 250 amps. at the electrode. So that test would be continuous, three welding operators were used. When one got tired, another took over. All used the drag technique with a 6010 rod—which is as close to a short circuit as you can get.

At the end of 8 hours, the P&H generator was still cool. And the WN-250 was still rarin' to go—the weldors were worn out, but not the machine.

the P&H *line*

25958

HOT ASPHALT pours into new Morania No. 160 barge. Double-hull construction and double heating coils are designed to maintain cargo at workable temperatures.

Want to ship a 40-mile highway somewhere?

You could pave a two-lane highway from Baltimore to Washington with the hot asphalt this new steel barge can haul — and pave another three miles besides.

Designed and built by Barium's Wiley Manufacturing Co., Port Deposit, Md., for Morania Oil Tanker Corp., the 240-ft. Morania No. 160 is now running from Baltimore, Md., or Barber, N.J. to points on the N.Y. State Barge Canal and ports on the Atlantic coast, principally moving asphalt of the American Bitumuls & Asphalt Co. It has made a big splash in maritime circles because (1) it holds as much asphalt as 67 railroad tank cars and (2) it's the only asphalt barge designed to operate in both inland and coastwise service.

What's more, on her first trip, the Morania No. 160 hung up a new record for discharging — 16,000 barrels in seven hours!

However, full utilization of low-cost water transport also calls for strategically located terminals specially designed for heated bulk storage of asphalt. Here, too, Barium has the answer — Wiley can design, engineer, fabricate and erect new-design terminals under a turn-key contract.

You can also see in this barge more evidence of Barium's "integrated operations". Wiley builds it, but Barium's Central Iron & Steel and Phoenix Iron & Steel supply plate and structural steel respectively.

A long list of firms have learned to expect this type of joint action from Barium's 16-company team. We're saving a copy of "The Barium Story" for you, if you'd like to know more. BARIUM STEEL CORPORATION, 25 Broad St., New York City 4.

4.20

16 INTEGRATED COMPANIES
BARIUM
STEEL CORPORATION
WORKING IN STEEL, ALUMINUM, MAGNESIUM, FIBERGLASS

BAYONNE BOLT CORP. • CENTRAL IRON AND STEEL COMPANY • CHESTER BLAST FURNACE • CLYDE IRON WORKS, INC. CUYAHOGA SPRING COMPANY • EAST COAST AERONAUTICS, INC. • ERIE BOLT AND NUT COMPANY • GEOMETRIC STAMPING CO. GLOBE FORGE, INCORPORATED • INDUSTRIAL FORGE & STEEL, INC. • JACOBS AIRCRAFT ENGINE CO. • KERMATH MANUFACTURING CO. • KERMATH LIMITED (CANADA) • PHOENIX BRIDGE CO. • PHOENIX IRON & STEEL CO. • WILEY MANUFACTURING CO.

Colonial "SUBTRACTING" machines

they subtract production costs ... add to profits

Subtraction #1—the *Broach.* With the Colonial broach designed specifically to broach the part efficiently to the tolerances specified at the required rate of production, cost subtraction starts.

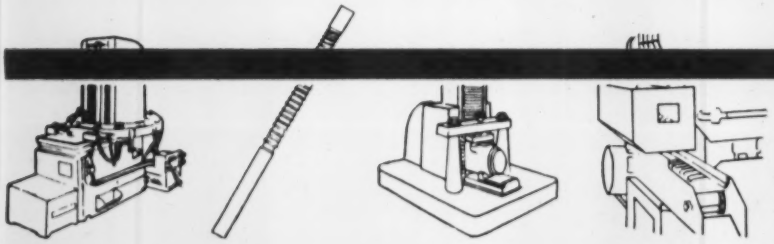
Subtraction #2—the *Machine.* Selecting one of the more than 60 dependable Colonial broaching machines capable of handling the broach at the specified rate of production is the next important step in subtracting costs.

Subtraction #3—the *Fixture.* The Colonial fixture, locating and clamping the part in broaching position, while at the same time permitting maximum accessibility for loading and unloading, is another important step in cost subtraction.

Subtraction #4—the *Automation.* Where high production requirements make loading and unloading time an important factor, the Colonial automation of the broaching installation will serve to further subtract machining costs.

ADDITION—By adding the four important Colonial cost subtracting features above, today's cost conscious metalworking plant has a complete *Colonial Unified Broaching Installation* capable of producing the part at lowest possible cost with utmost accuracy. To subtract costs and add to profits in your plant, ask Colonial Broach to quote on Unified Broaching installations for your parts.

Ask for bulletin 877 on complete line of Colonial broaching machines



COLONIAL

YOU GET MORE WITH ALL-PURPOSE "TRICLENE"* D

(TRICHLORETHYLENE)

New Du Pont solvent is unsurpassed in any vapor degreasing job!

Check these extras

EXTRA DURABILITY. With the greatest all-around ruggedness ever built into a trichlorethylene, *new* "Triclene" D has unsurpassed resistance to *all* major causes of solvent breakdown—heat, light, air, metal chlorides, and acidic materials—yet contains nothing to harm the most delicate metal surfaces.

EXTRA OPERATING ECONOMY. Because *new* "Triclene" D is free from salt-forming inhibitors and staining materials, you get safe, thorough cleaning with fewer costly rejects—fewer interruptions for cleanouts. Made with locked-in stabilizers, *new* "Triclene" D retains its original ruggedness even after repeated use and distillation.

EXTRA CONVENIENCE. *New* "Triclene" D is an all-purpose solvent, built to give you dependable performance in any vapor degreasing job. This means you can buy just *one* brand of solvent for any type degreaser—for any class work.

Try *new* "Triclene" D and see why we consider it the greatest improvement ever made in any trichlorethylene for vapor degreasing. Your Du Pont representative will be glad to give you further details on *new* "Triclene" D. Call him today or fill out and mail coupon below.

*REG. TRADE-MARK.

New All-Purpose

"TRICLENE" D

Trichlorethylene

DU PONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

SEND FOR THIS NEW DESCRIPTIVE FOLDER

E. I. du Pont de Nemours & Co. (Inc.) S-11
Electrochemicals Department, Wilmington 98, Del.

☐ Please send me your descriptive folder on new, all-purpose "TRICLENE" D.

☐ Please have your representative call with the details.

Name _____ *Position* _____

Firm _____

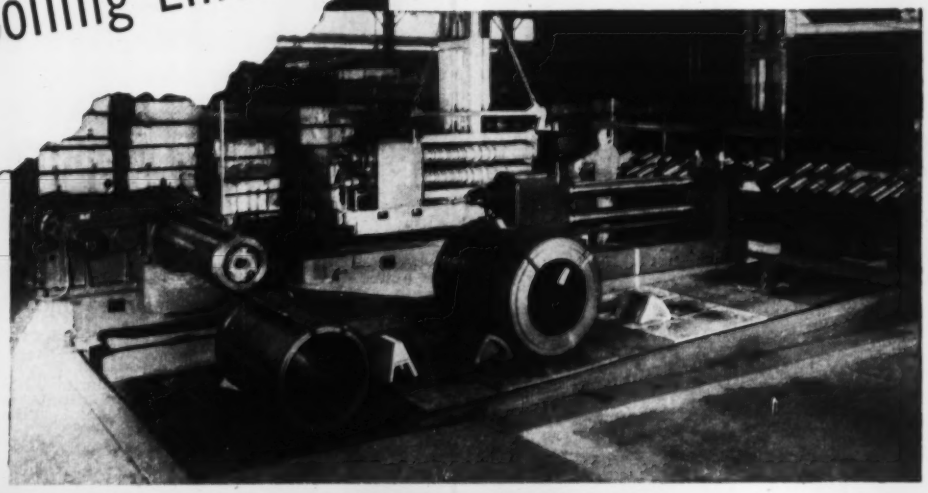
Address _____

City _____ *State* _____

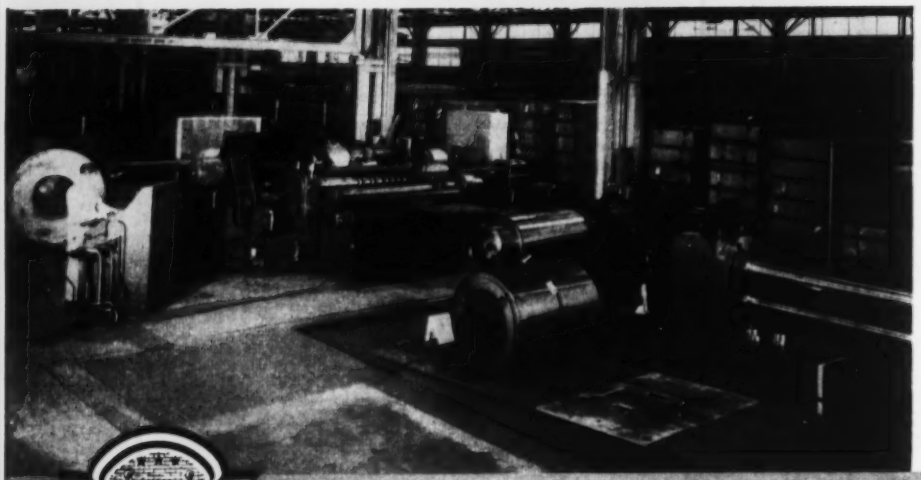
Step Up Production with Stamco Slitting and Coiling Lines

Stamco Slitting and Coiling Lines will step up your production because they are designed to meet your particular specifications. Years of experience have led to the development of equipment that will meet every slitting and coiling requirement. Stamco slitting and coiling lines are now efficiently handling coils from 500 to 60,000 pounds and are designed to give dependable, maintenance-free service.

Write us, stating your requirements . . . we'll gladly give complete details — no obligation.



View shows coil lift and traverse, coil pay off reel, coil loading ramp and detachable slitter head.



Overall view of coiling line from entrance end.

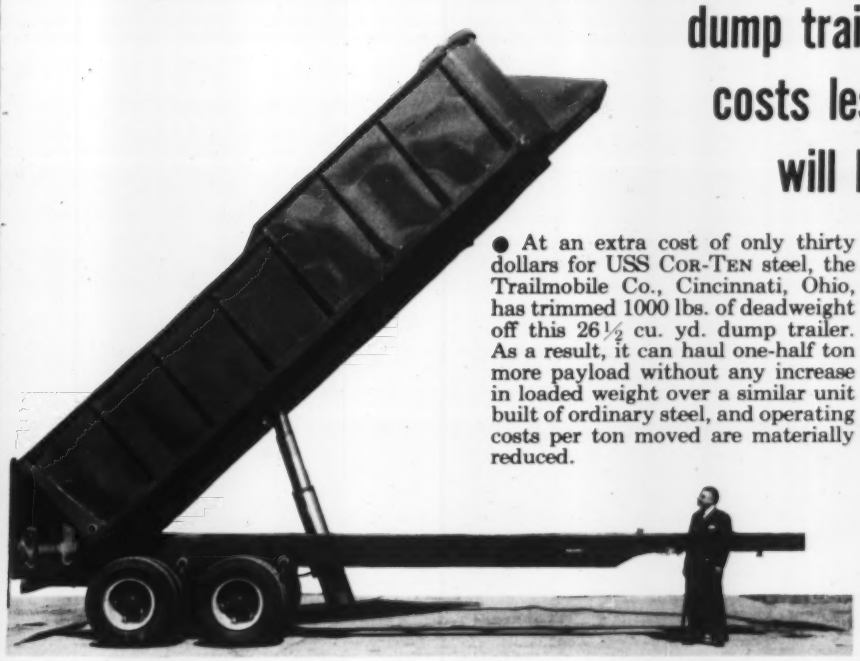
LAY YOUR SHEARING PROBLEMS AT STAMCO'S DOOR

STAMCO, Inc., New Bremen, Ohio

New facts for your file on USS HIGH STRENGTH STEELS

Built 1000 lbs. lighter with USS COR-TEN steel

dump trailer hauls more, costs less to operate, will last longer



● At an extra cost of only thirty dollars for USS COR-TEN steel, the Trailmobile Co., Cincinnati, Ohio, has trimmed 1000 lbs. of deadweight off this 26½ cu. yd. dump trailer. As a result, it can haul one-half ton more payload without any increase in loaded weight over a similar unit built of ordinary steel, and operating costs per ton moved are materially reduced.

But USS COR-TEN steel does more than save weight and lower operating costs. Its high yield point of 50,000 psi—one and a half times that of carbon steel—gives the trailer body exceptional strength and toughness. Its much higher resistance to atmospheric corrosion, its superior resistance to abrasion, impact and wear greatly increase durability, keep the trailer on the job and help to prolong its life.

Since its introduction twenty years ago, USS COR-TEN steel has been used by 27 leading builders of trucks and trailers—names famous in the commercial car industry—to produce equipment that is lighter, more durable, able to do more work and cheaper to operate and maintain.

50% stronger and 20% lighter,

concrete forms of USS COR-TEN Steel last almost twice as long as carbon steel, materially reduce shipping costs

On many construction jobs, steel forms to hold concrete in place until it has hardened are now used instead of expensive wasteful forms built up of ordinary construction materials.

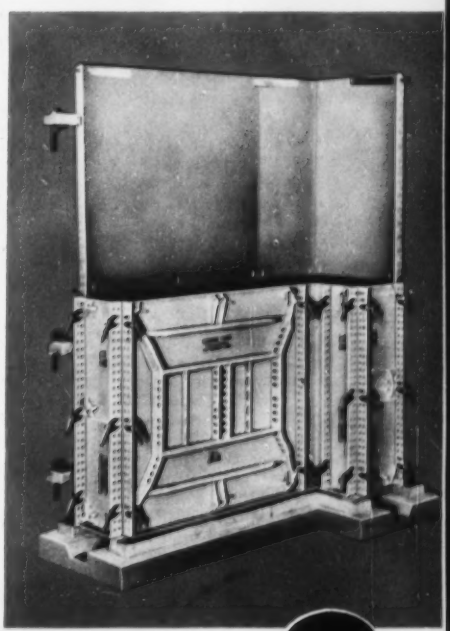
Such steel forms not only speed up work and save labor costs but, because they can be used over and over, save material as well.

A major producer of steel concrete forms is the Economy Forms Corporation, Des Moines, Iowa, which rents forms to contractors. This manufacturer reports that COR-TEN Steel used in their forms since 1948 has effected substantial savings because of its greater strength and higher corrosion resistance as compared to carbon steel.

For example, carbon steel forms, 30″ x 30″, can withstand a pressure of 1000 lbs. per sq. foot. They weigh 48 lbs. each and last about 6 years. In contrast, COR-TEN Steel forms of the same size, can withstand a pressure of 1,500 lbs. per sq. foot, but they weigh only 38 lbs. each and have a probable life of 8 years. The use of COR-TEN sheets for these forms has reduced the maintenance cost approximately 40%.

Concrete forms are shipped an average of ten times each year and here COR-TEN Steel forms pay further dividends because they weigh less.

Economy Forms Corporation estimates their freight savings to be 10¢ to 12¢ per sq. ft. per year, which runs into a pretty penny when you consider that they have 1,200,000 sq. ft. of forms in use.



UNITED STATES STEEL COMPANY, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

UNITED STATES STEEL

New facts for your file on

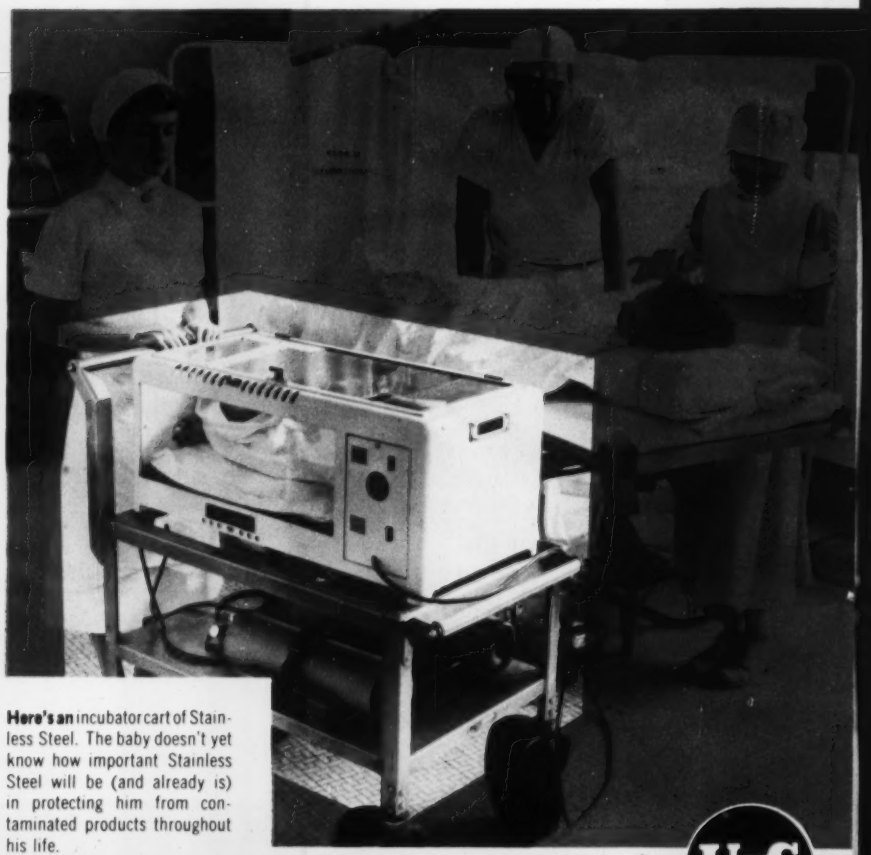
Hospitals depend upon Stainless Steel in kitchens and operating rooms...

it's so easy to keep clean and sanitary

Stainless Steel equipment is vital to the operation of all modern hospitals. The Cook County Hospital in Chicago uses Stainless Steel extensively wherever equipment must be kept clean and sanitary. Only Stainless Steel is so dependably safe and so long lasting. It effectively resists rust and corrosion, is easy to keep clean and shining. All the Stainless products shown here are supplied by Colson Corporation of Elyria, Ohio.

This open-tray truck is also of Stainless Steel. So it will last longer and will be easy to keep clean and good-looking.

Another shining example of Stainless Steel beauty, this battery of food conveyor trucks will see many years of trouble-free service in the Cook County Hospital kitchen.



Here's an incubator cart of Stainless Steel. The baby doesn't yet know how important Stainless Steel will be (and already is) in protecting him from contaminated products throughout his life.

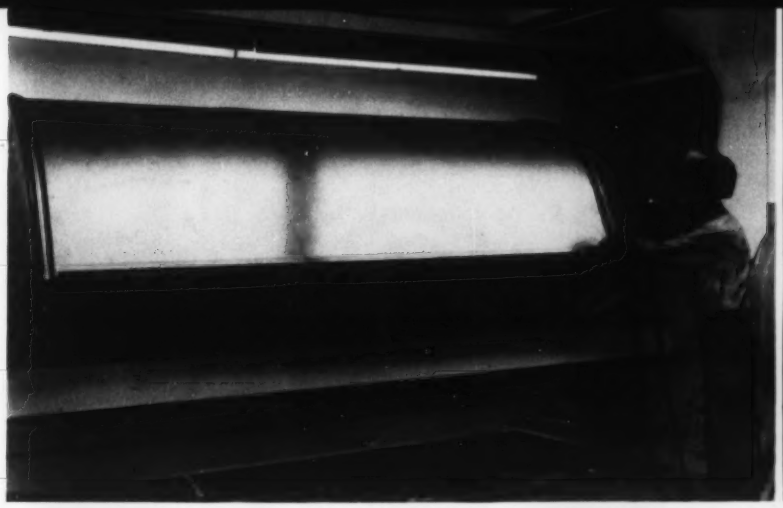
USS

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES [illegible] DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS



Here's the jig that holds the body sheets while the end sheets are arc welded on.

Frank Ramacier, shop foreman, inspects the finished pasteurizer.

Stainless Steel requires good mechanics, a little care, and good equipment for fabricating

Frank Ramacier, Metal Shop Foreman at the Farwell Metal Fabricating Division of Farwell, Ozman and Kirk Co., St. Paul, has been handling Stainless Steel and other metals for over 20 years. Says he, "If a fellow's a good metal worker, it doesn't take much to teach him how to handle Stainless." He recommends, of course, care in handling and good equipment in good condition.

As an example, let's see exactly how Farwell goes about fabricating a big 500-gallon milk pasteurizer . . .

302 Stainless Steel is used; 18 gage end sheets and 20 gage body sheets.

SHEARING. Paper protection is applied to protect the finish prior to shearing the 49½" x 106" sheets to 49" x 105". A ⅜" capacity shear with blades kept very sharp is used to assure greatest accuracy.

ARC WELDING. Two body sheets are butt welded together to make one body sheet.

NOTCHING. Heavy-duty (60-ton) press is used for top accuracy; notches sheet corners.

FLANGING. Five passes on a 16 gage capacity flanger secure 1" flange on end sheets.

BRAKING. ⅜" capacity brake press is used—again a heavy machine is used to guarantee greater accuracy. Top edge of the end sheets and top edge of the body sheet are flanged to 90°.

ARC WELDING. (second) Welding of the end sheets to body sheet is done on a special jig (see cut) that makes the welding easier and faster. The body sheet is shaped in this jig and is held until the end sheets are welded to it. Top corners are welded together. An outlet is arc welded.

GRINDING. Smoothes and polishes the welds.

That's it and another non-contaminating, corrosion-resistant Stainless Steel pasteurizer is ready to go to work.

Take advantage of Stainless Steel in your designs and in your selling

Here are just a few examples of how Stainless Steel has been used to improve design, add sales appeal, give better end use results. The wide range of valuable properties available in Stainless Steel makes it the ideal material for many, many jobs.

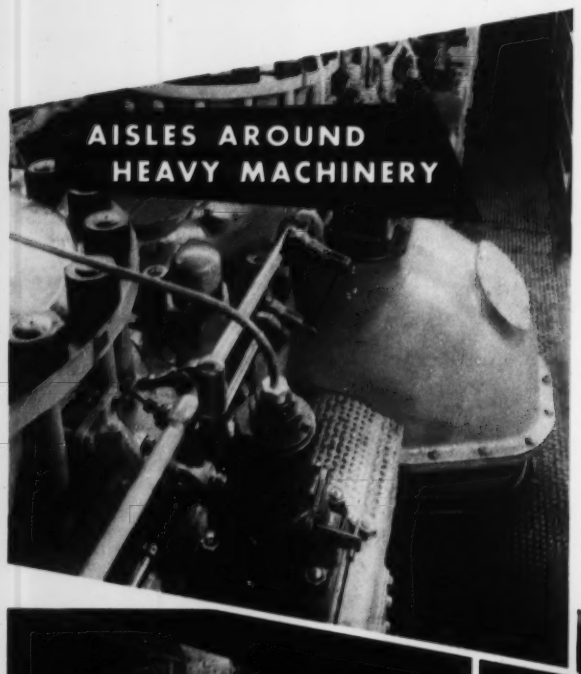
Put Stainless to work for you. It will pay its own way and give you good return on your investment – especially if it is perfected, service-tested USS Stainless Steel.

USS Stainless Steel offers you the widest possible freedom in selecting the grade, shape and finish to fit your design and fabricating procedure best. And the services of our metallurgical engineers are always at your disposal to help you cut costs and get the best results from USS Stainless Steel.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS

UNITED STATES STEEL

Have you *safe-treaded* all the danger spots in your plant . . . with Multigrip?

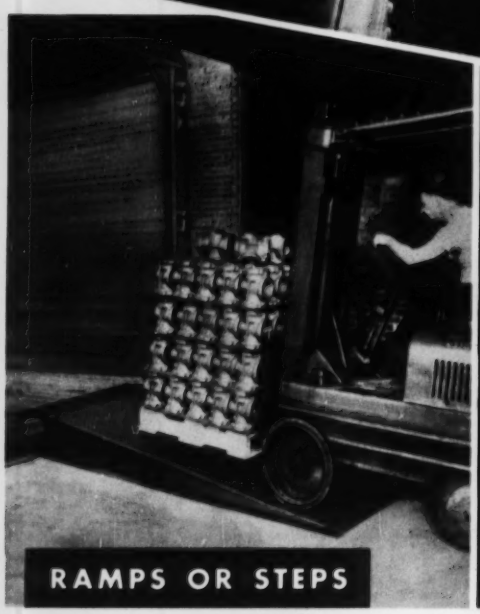


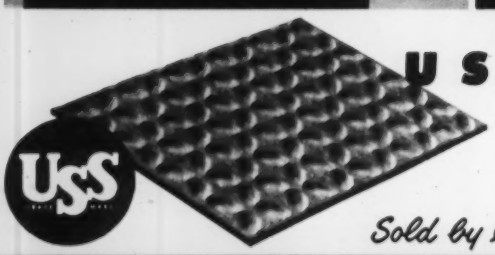
● USS Multigrip Floor Plate was scientifically designed to prevent accidents resulting from slips and skids. It'll pay you to look around *your* plant or shop for possible accident-prone areas that could be made safe with Multigrip. For it provides positive traction for feet and wheels at all times, from any direction.

Multigrip is comfortable to walk on, less tiring to work on because its "grip" risers are flat-topped.

Not only does Multigrip protect workers, but it protects floor surfaces too. It is rugged, heavy duty steel plate that will last for years without requiring any maintenance. (Multigrip does not chip, crack, rot or splinter as other flooring materials do.) And it's easy to keep clean . . . a quick "once over" with the hose or broom will get it spick and span. There are no niches to hold dirt; water drains quickly in any direction.

UNITED STATES STEEL CORPORATION, PITTSBURGH
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, CHICAGO
UNITED STATES STEEL EXPORT COMPANY, NEW YORK





USS **multigrip**

FLOOR PLATE

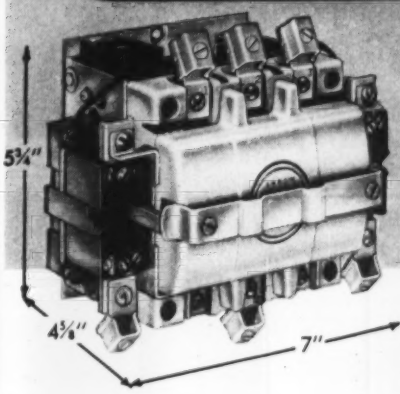
Sold by leading distributors from coast to coast

UNITED STATES STEEL

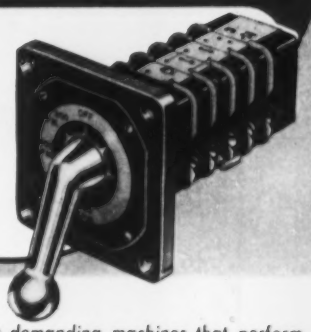
AUTOMATION BRINGS PROGRESS AND PROBLEMS

ARROW·HART ADVANCED DESIGN ELECTRICAL CONTROLS

HELP YOU SOLVE THEM!



SIZE 2 STARTER



"PPS" PUSH-PULL SELECTOR SWITCH

Industry, in its march toward automation, is demanding machines that perform more functions automatically. This means that machines are becoming increasingly more complicated; the problems of space and weight are more acute than ever before. More . . . and more complicated . . . electrical controls are required, and there is less space available to accommodate them.

These problems create a major challenge to Machinery Designers . . . and here are only 2 of the outstanding Arrow-Hart Controls that can help to meet it.

"PPS" PUSH-PULL SELECTOR SWITCH

- **SAVES SPACE 2 IMPORTANT WAYS**

  — **BECAUSE IT IS THE *ONLY PILOT DEVICE* REQUIRED** where push buttons and selector switch were formerly used.

  — **BECAUSE IT MAKES A *SINGLE MAGNETIC CONTROL* DO THE WORK OF MANY . . .** reducing the number of starters, contactors, relays etc. required by a machine.

- **CUTS COSTS**

  — **BECAUSE THERE ARE FEWER CONTROLS TO BUY, MOUNT, WIRE, INSPECT AND MAINTAIN.**

- **PROVIDES MORE CONVENIENT, SAFER SINGLE-POINT CONTROL FOR MULTIPLE OPERATIONS**

  — **UP TO 16 MACHINE FUNCTIONS** can be controlled by a single, compact "PPS" Switch. The operator can move from any position on the dial to any other without activating any of the intervening circuits.

  — **PROTECTS MACHINE and OPERATOR** because one operation can be stopped before another is started if this sequence is desired. Position of single handle always indicates the last operation performed.

  — **CUSTOM MADE FROM STANDARD COMPONENTS,** the "PPS" provides unparalleled versatility, assures the best, most convenient control for any application at lowest cost.

"RA" RIGHT ANGLE Design MOTOR CONTROLS

- **RADICALLY SMALLER AND LIGHTER . . .** than any other control of comparable rating available anywhere.
- **WITH SUPERIOR PERFORMANCE AND DEPENDABILITY . . .** revolutionary "Right Angle" Operating Mechanism — an Arrow-Hart exclusive — utilizes a bell crank fulcrum that multiplies leverage, increases contact pressure and allows a much smaller magnet easily to outperform old-fashioned, direct-acting types.
- **EASIER TO INSTALL, MAINTAIN . . .** Straight-Thru Wiring eliminates looping, U-bending, saves space and time. All wiring, terminals and contacts are easily accessible from the front. Smaller starter size leaves more room for wiring within the enclosure and on the panel board.
- **A COMPLETE LINE . . .** of "RA" Starters and Contactors is available for all your Electrical Control needs.

WRITE NOW FOR COMPLETE INFORMATION

Use the attached coupon to send for your free copies of "PPS" and "RA" Design Story Folders *TODAY*.

SINCE 1890

ARROW·HART
INDUSTRIAL CONTROL DIVISION
103 HAWTHORN ST., HARTFORD 6, CONN., U.S.A.

Offices, sales engineers and warehouses in: Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Houston, Indianapolis, Kansas City, Mo., Los Angeles, Milwaukee, Minneapolis, New York, Philadelphia, Pittsburgh, St. Louis, San Francisco. **In Canada:** Arrow-Hart & Hegeman (Canada) Ltd., Mt. Dennis, Toronto. **In England:** Arrow Electric Switches, Ltd., Ealing, London W5.

Quality MOTOR CONTROLS • WIRING DEVICES
ENCLOSED SWITCHES • APPLIANCE SWITCHES

INDUSTRIAL CONTROL DIVISION
THE ARROW-HART & HEGEMAN ELECTRIC CO.
103 HAWTHORN STREET, HARTFORD 6, CONN

Please send my free copies of the Arrow-Hart "PPS" and "RA" Design Story Folders.

NAME _____
POSITION _____
COMPANY _____
CO. ADDRESS _____
CITY _____ ZONE _____ STATE _____

Capsule Case History:

Hard nut to crack!

How to expand a plant with a minimum of interference to operations is a problem that calls for an ingenious solution. One example of Kaiser Engineers' planning foresight is its outstanding record of maintaining operating efficiency during the construction period.

17 Days
Downtime To Install

2 new stands to a 4-high, 4-stand 86" hot strip mill and relocating the flying shear, is a record of Kaiser Engineers on a recent steel mill expansion. By careful scheduling and close cooperation with the operators, most of the installation work was accomplished while the mill continued in operation.

Such cost-saving procedures are a built-in feature of the services of the KE team of engineers.

Write today for a reprint of the story of this modern steel plant and for Kaiser Engineers' 32-page experience record book.

kaiser | engineers ...*for low operating costs*

DIVISION OF | HENRY J. KAISER COMPANY

ENGINEERS K CONTRACTORS

• HOME OFFICE: KAISER BUILDING, OAKLAND 12, CALIFORNIA (CABLE: KAISENGS) NEW YORK, PITTSBURGH, LOS ANGELES, WASHINGTON, D. C.
• HENRY J. KAISER CONSTRUCTION CO. • HENRY J. KAISER COMPANY (Canada) LTD., MONTREAL

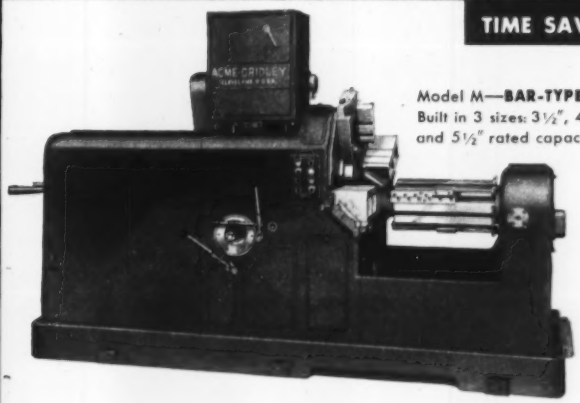
CAN YOU TURN NON-PRODUCTIVE TIME INTO SAVINGS LIKE THESE?

On each of the examples shown here, most of the savings resulted from reducing the time between cuts. Almost all modern machines can make chips as fast as present day cutting tools can "take it," but only Automatically Controlled Cycle* gives you an opportunity to save where it counts most — by reducing non-productive time required to withdraw the tool, index the turret and advance the tool to the work. Acme-Gridley Fully Automatic Turret Lathes do this job at accelerated speeds — with minimum waste of time and manpower

Model MC—**CHUCK-TYPE**
Rated capacity 12".

TIME SAVED on Acme-Gridley Fully Automatic Chuck-Type Turret Lathe

Part Name	Finger Holder Body	Master Collet Blank
Material	6⅝" dia. Semi-Steel	6" dia. 4160 Steel (Solid Slug)
Former Time	39.2 minutes	98 minutes
"MC" Time	11.2 minutes	35.4 minutes
	Savings 28 Min.	**Savings 62.6 Min.**



Model M—**BAR-TYPE**
Built in 3 sizes: 3½", 4¼" and 5½" rated capacities

TIME SAVED on Acme-Gridley Fully Automatic Bar-Type Turret Lathe

Part Name	Sleeve—4x3¼" long	Whirl—3½x4⅝" long
Material	1112 Steel	Leaded Open Hearth Steel
Former Time	30 minutes	21 minutes
"M" Time	6 minutes	5.7 minutes
	Savings 24 Min.	**Savings 15.3 Min.**

Here's what AUTOMATICALLY CONTROLLED CYCLE* means to you

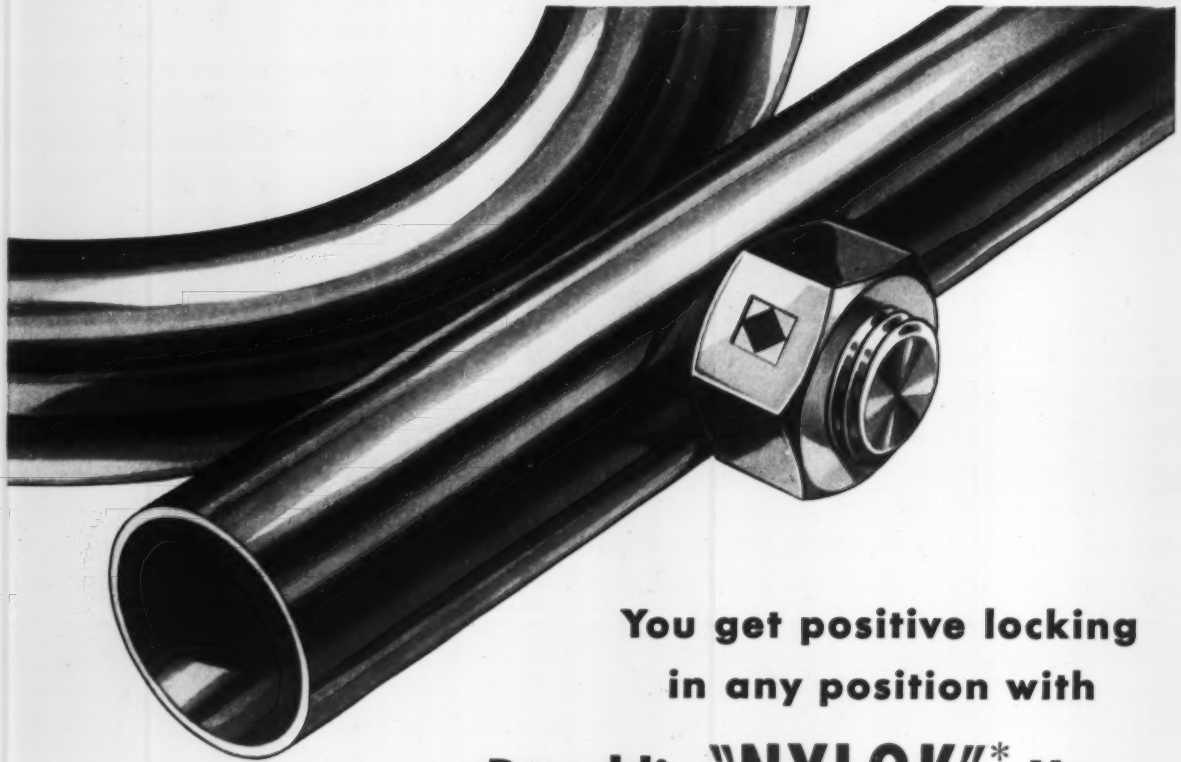
- **The complete machining cycle is faster because all non-productive movements are performed automatically — and at *accelerated* speeds.**
- **Cuts are made (with either high-speed or carbide tooling) as fast as present day cutting tools can take it.**
- **Producing rate is thus predetermined and remains the same at the end of the shift as at the start.**
- **Machining is done at the surface speed best suited for required finish and tolerance because each toolslide is independently cammed and selective spindle speeds are automatically controlled.**

Standard on all Acme-Gridleys

The NATIONAL ACME COMPANY

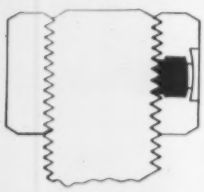
170 EAST 131st STREET • CLEVELAND 8, OHIO

ACME-GRIDLEY BAR and CHUCKING AUTOMATICS
1-4-6 and 8 Spindle • Hydraulic Thread Rolling Machines • Automatic Threading Dies and Taps • Limit, Motor Starter and Control Station Switches • Solenoids • Contract Manufacturing.



You get positive locking in any position with

Republic "NYLOK"* Nuts



Here's how the "Nylok" principle works
A nylon plug inserted in one of the sides of the cold-forged nut forces the nut tightly against the opposite threads as the nut is turned on.

*U. S. Pat. No. 2,462,603 and No. 2,450,694 and pending applications.

Locking is positive even when the "Nylok" Nut is seated against a tubular section. And there's no need to pull Republic "Nylok" Nuts up tight. They lock wherever you stop wrenching—eliminating the need for lock washers.

These lock nuts are simple to apply. Either end is up. No special tools, lubricants or techniques are needed. Republic "Nylok" Nuts can be re-used.

Does this give you an idea for your product? Write us for samples, indicating sizes required.

12 WAYS BETTER

Assemble from either end • Can be re-used • Non-galling • Best wrenching characteristics • One-piece • Cold-forged • Won't damage threads No special tools • Lock in any position • No special know-how • No lubricants needed • Ideal for mechanical feeding

SIZES

Finished Series tapped ¼" through 1"
Finished Thick Series tapped ¼" through ½"
Heavy Series tapped ¼" through 1"

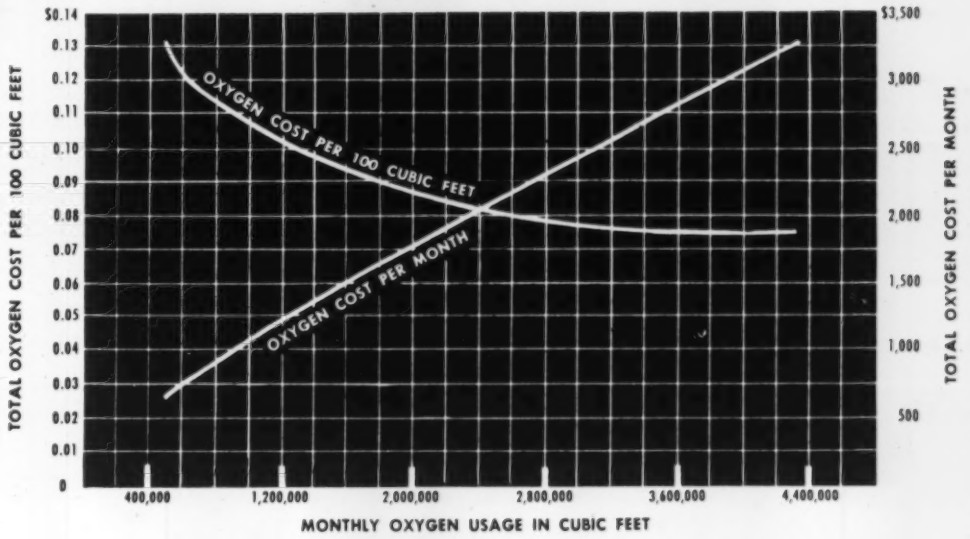
REPUBLIC STEEL CORPORATION
Bolt and Nut Division • Cleveland 13, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, New York

REPUBLIC BOLTS AND NUTS

REPUBLIC STEEL

OXYGEN USERS: If you use between 600,000 and 4,000,000 cu. ft./month

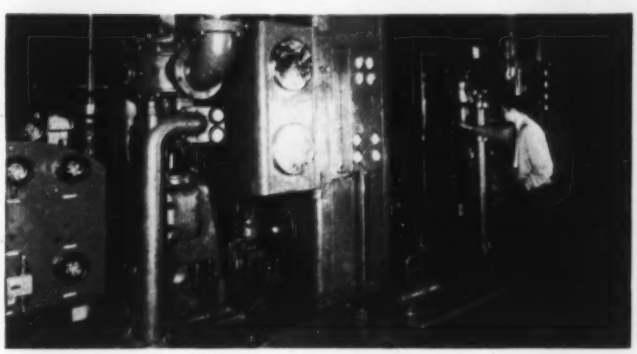
HERE'S ALL YOUR OXYGEN NEED COST* YOU!



Investigate the JOY OX-20 Oxygen Generator

CAPACITY—2000 cu. ft. per hour . . . PURITY—99.5%

The Joy principle of oxygen generation not only affords high-purity oxygen at the lowest possible cost. The unit (see twin installation pictured below) is also as reliable and easy to handle as an air compressor—and it's absolutely safe and fully automatic in operation. What's more, there are no bothersome chemicals to handle and store; no messy chemical wastes to remove. • If your oxygen usage is between 600,000 and 4,000,000 cu. ft. per month, let us give you facts and figures on a JOY oxygen generating installation to do the job for you. ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario*



***Above costs include:**

Power (at $0.01 per KWH)
Water (at $0.10 per 100 cu. ft.)
Attendance Labor (at $2.00 per hour)
Maintenance (Labor and Parts)
Amortization (Ten-year Basis)

Consult a Joy Engineer

W&D 15388

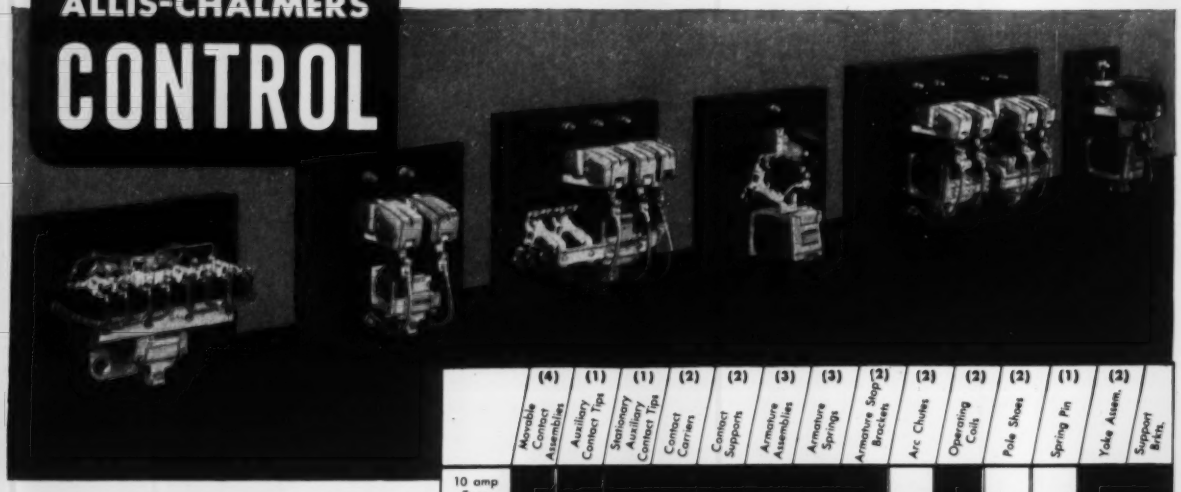
JOY

SPECIALISTS IN THE COMPRESSION AND MOVEMENT OF AIR AND GASES SINCE 1885

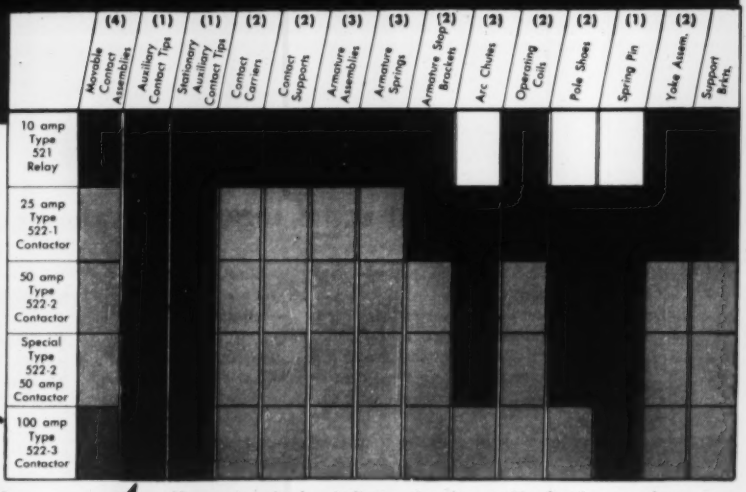
For 10 to 100 AMP applications

Check this New dc Control Line

ALLIS-CHALMERS
CONTROL



- This new line of general purpose, heavy-duty dc control starts with a multi-pole auxiliary relay and includes contactors ranging from 25 to 100 amps. The contactors are available in five basic units with optional arrangements of normally open and normally closed main and auxiliary contacts.



Change in color bar indicates size change. Number in parentheses tells how many sizes of that component are needed.

Outstanding Interchangeability of Parts Affords Maximum Convenience and Economy

This chart graphically illustrates the exceptional interchangeability of parts in this new control line. Maintenance is greatly simplified. Only a small inventory of parts is needed to keep these controls operative. The possibility of lengthy, costly "down" periods is practically eliminated.

Other Features — Vertical action contactors have a rolling, self-wiping action. Contactor tips are forged copper. Current-carrying parts are silver plated. All other metallic parts are zinc plated. Relay tips are silver alloy.

A-4448

New Bulletin — Bulletin 14B8171 gives data on the Allis-Chalmers dc line which now covers the *complete range up to 600 amperes*. See your local Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wis.

ALLIS-CHALMERS

Perfect for nut forming

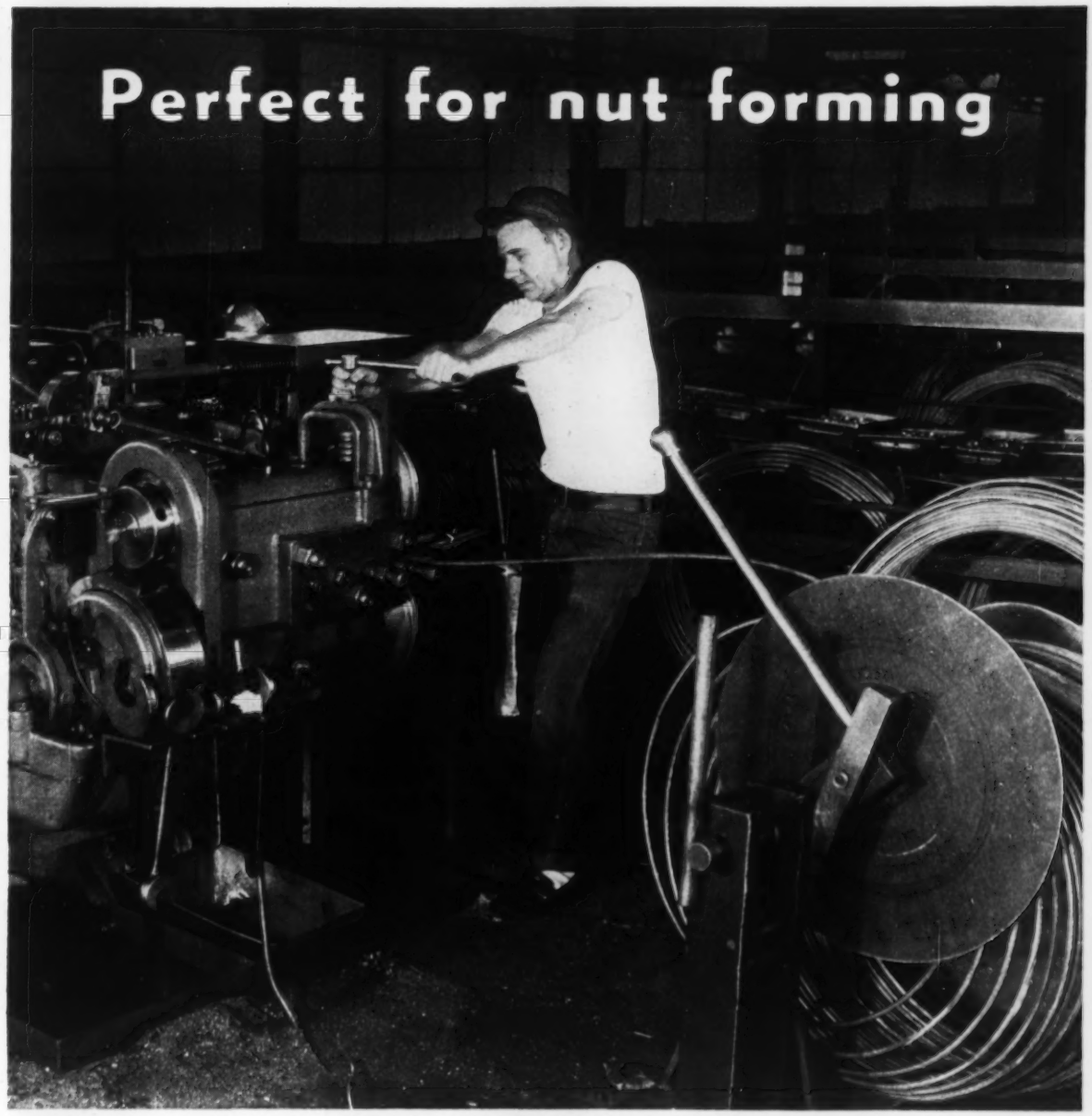


Photo courtesy of Decker Manufacturing Company

Youngstown

QUALITY YOUNGSTOWN SERVICE

SCRAPLESS NUT QUALITY WIRE

●Youngstown Scrapless Nut Quality Wire is outstanding for its excellent surface and sound internal structure. This uniform high quality results directly from close control of manufacture—from the ore mines clear through to finished product. Thus customers can always be sure that Youngstown wire will stand up under the punishing operations of cold heading, cold punching and thread tapping.

THE YOUNGSTOWN SHEET AND TUBE COMPANY Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices: Youngstown, Ohio - District Sales Offices in Principal Cities

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

History in the Making

MEN WITH
A VISION
AND A
PURPOSE

THE CLEVELAND MEN

Under authority of a special act of the Michigan legislature, on December 26, 1850 "The Cleveland Men" met at the old Canal Bank in Cleveland, Ohio to form The Cleveland Iron Mining Company. From this beginning grew The Cleveland-Cliffs Iron Company. This pioneering undertaking was one of the initial steps in the founding of the great Lake Superior iron ore industry.

LAKE SUPERIOR IRON ORE • VESSEL TRANSPORTATION
FERRO ALLOYS

THE Cleveland-Cliffs IRON COMPANY

UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

What size is a quality fastener?

Here are two ELASTIC STOP® nuts.
Each has the familiar red locking collar. Each is self-locking, vibration-proof and can be reused many times. Each is a fast, readily assembled one-piece unit . . . will maintain accurate adjustment anywhere on a bolt. Each will afford positive protection against thread corrosion . . . prevent liquid seepage along bolts. Each is manufactured in quantity. Each is exactly controlled as to quality of raw material, finished dimensions, class of thread fit, seat squareness and finish. Each has a record for precision and uniformly high performance that is unmatched.

But . . . one measures 1/10 inch across the flats; the other, 4 inches. Between these two, there are more than 530 different hex nuts in the ESNA line. They are the result of variations in height, material, finish and size.

Look to ESNA for the top quality self-locking fastener that fits your need best.

ELASTIC STOP NUT CORPORATION OF AMERICA

ESNA® TRADE MARK

ROLLPIN TRADEMARK

Elastic Stop Nut Corporation of America
Dept. N58-1160, 2330 Vauxhall Road, Union, N. J.
Please send the following free fastening information:

☐ ELASTIC STOP nut bulletin

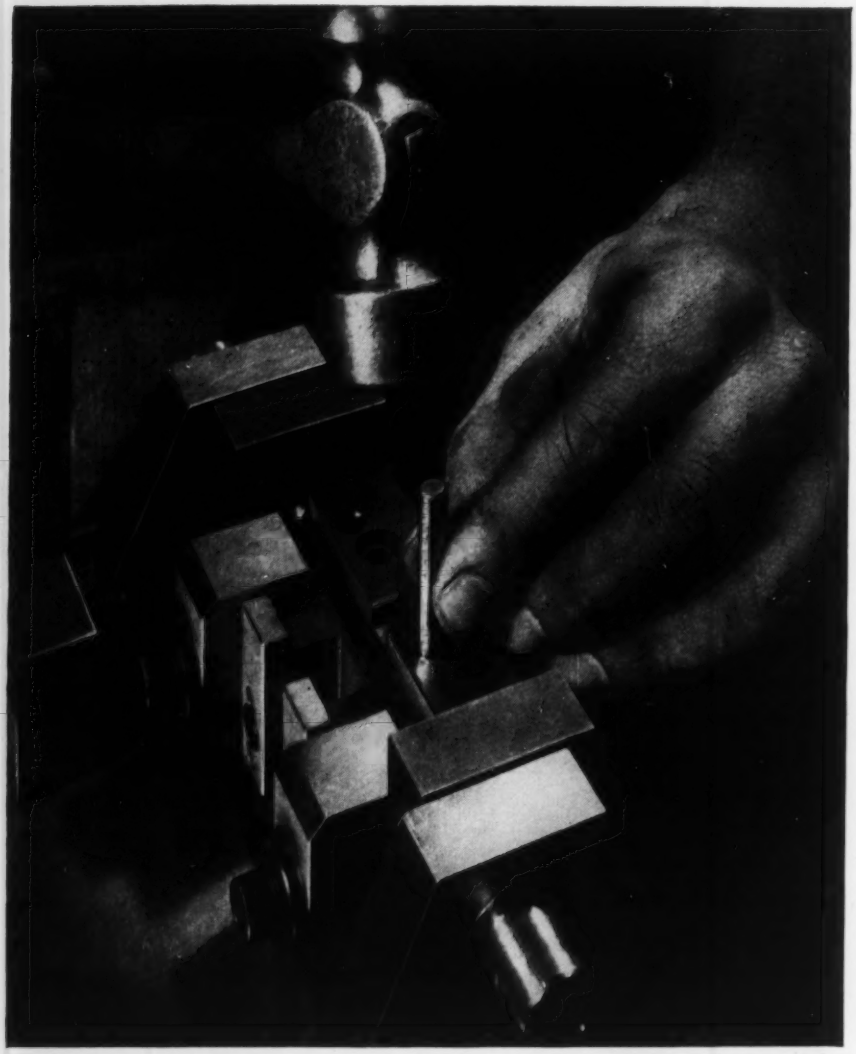
☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name _____ Title _____

Firm _____

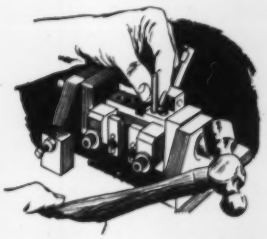
Street _____

City _____ Zone _____ State _____



UNBRAKO Precision-Ground Dowel Pins are widely used for aligning parts, as in dies, jigs and fixtures. This radius grinding fixture, for putting a flat on electronic shafting, is a good example of such an application.

Assembler inserts formed end of UNBRAKO dowel pin into hole preparatory to tapping it into position.



Formed ends, with continuous grain flow, won't chip. Uniform heat treatment permits UNBRAKO dowel pins to be driven in and out of holes without upsetting.

UNBRAKO dowel pins—made of heat treated alloy steel—have a surface hardness of 60-62 Rockwell "C" Scale; a surface finish of 6 microinch maximum; a core hardness of 50-54 Rockwell "C" Scale; an average single shear strength of 150,000 psi; and a diameter tolerance of ±0.0001". They are available in two standard sizes in diameters from ⅛" to 1".

Keep your inventory at a minimum

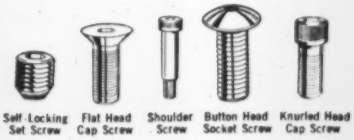
Use UNBRAKO Standards—stocked by your distributor

Because your UNBRAKO distributor stocks a full line of standard UNBRAKO socket screw products, your inventory is lowered. This ready supply not only cuts your investment, but gives you faster delivery and reduces your buying costs. For a complete listing of standard UNBRAKO products, see your distributor or write STANDARD PRESSED STEEL CO., Jenkintown 33, Penna.

UNBRAKO® SOCKET SCREW DIVISION

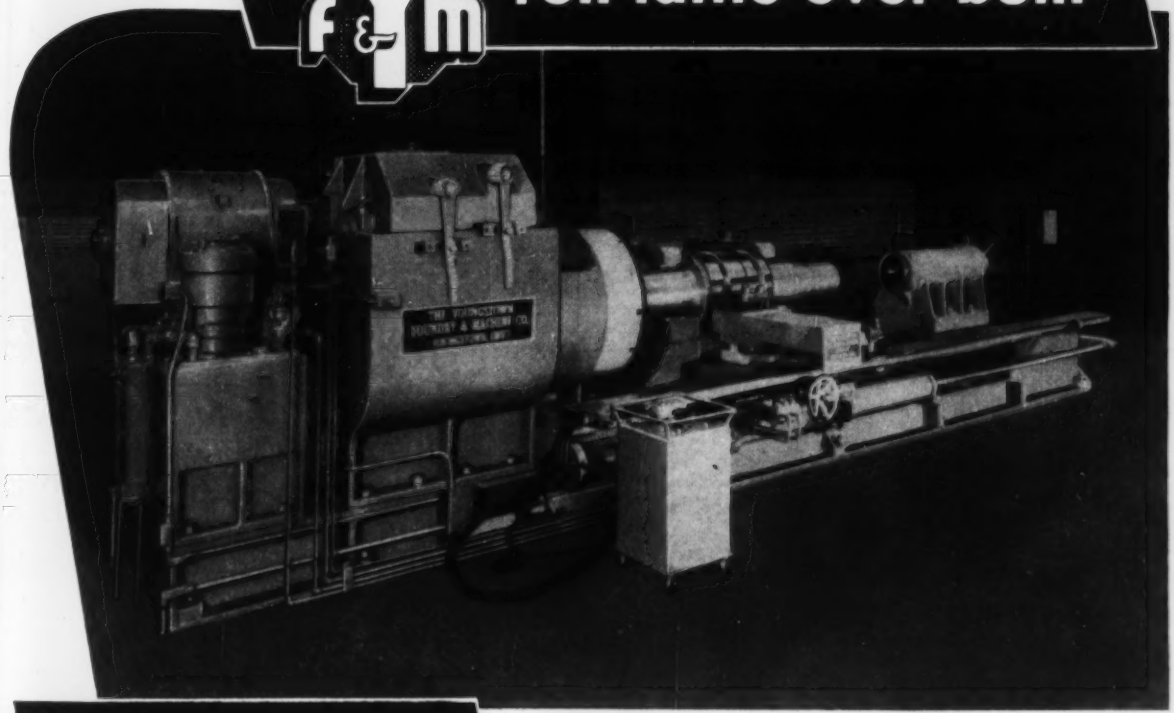
SPS

JENKINTOWN PENNSYLVANIA



NOW the most efficient * roll lathe ever built

F & Y m



* *Roll Lathe rigidity and finish with Engine Lathe speed and flexibility*

* *Completely hydraulic tracer control insures smoother, more accurate finish*

* *Tool post and carriage designed to use either single point carbide-tipped tools or regular roll turning tools*

* *Ways on carriage and tail stock are non-metallic, which greatly extends service life*

* *Timken roller bearings throughout; herringbone gearing; automatic lubrication*

You can turn rolls *better...* either on necks or centers

WITH THIS **New "YOUNGSTOWN" 36" Contour Roll Lathe**

Outstanding in performance! Tested! Proved! This lathe, originally developed and perfected for turning in our own roll shop, turns rolls either on necks or centers. Speed range .75 RPM to 53.5 RPM. Roll capacities: 6" minimum diameter, 36" maximum diameter, with 11'6" maximum length (subject to alterations to suit your specific needs). Your next Roll Lathe if you want the best.

Write for Complete Information

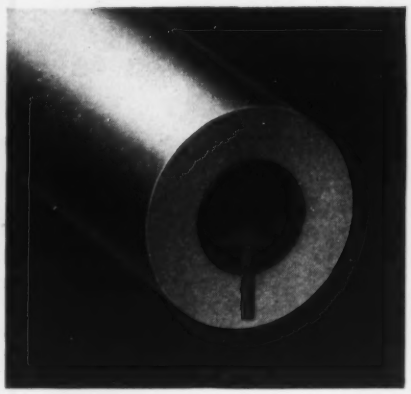
The Youngstown Foundry & Machine Co.

SERVING INDUSTRY SINCE 1885

Youngstown, Ohio

18

a hole here is annoying . . .



a hole here is helpful

Crucible Hollow Tool Steel Bars are helping eliminate the wasteful practice of drilling out a solid bar to make ring-shaped, or tubular steel parts, or tools with a center hole. The hole is already in Crucible hollow tool steel bars . . . no need for drilling, boring, cutting-off or rough-facing operations.

You can get these hollow bars in any of Crucible's famous tool steel grades, in almost any combination of O.D. and I.D. sizes. And you can get *immediate* delivery of five popular grades—KETOS® oil-hardening, SANDERSON® water-hardening, AIRDI 150® high carbon-high chromium, AIRKOOL® air-hardening, and NU DIE V® work tool steels—from a conveniently located Crucible branch warehouse.

Call your Crucible representative for the full story of how these steels can best save you time and money. You'll be glad you did.

CRUCIBLE first name in special purpose steels

54 years of Fine steelmaking

HOLLOW TOOL STEEL

CRUCIBLE STEEL COMPANY OF AMERICA • TOOL STEEL SALES • SYRACUSE, N. Y.

IF YOU MAKE, MOVE, OR MARKET
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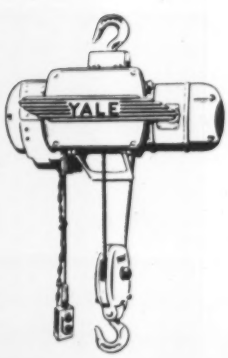
You can't afford to leave this out of your plans!

Progressive planning calls for modern handling methods in old and new plants alike. For, materials handling can account for as much as one-third of operating costs . . . remains the one phase of most manufacturing operations in which sizeable savings are still possible.

In fact, you can cut handling costs in half . . . and then in half again through proper use of YALE equipment. You can also increase productive capacity . . . make savings in time, space, manpower, and plant maintenance.

YALE offers the widest choice of truck models, fuels, capacities, and attachments. Under the Finance-Lease Plan, you can put YALE equipment to work for you . . . *without delay* . . . and without a major investment.

Get complete information from the YALE Sales and Service facilities located near you. Or mail the coupon.



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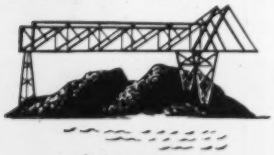
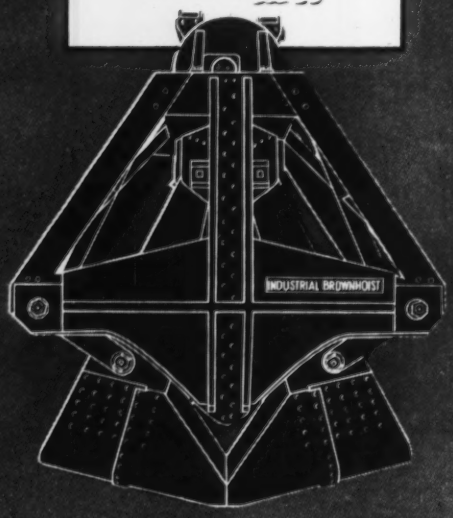
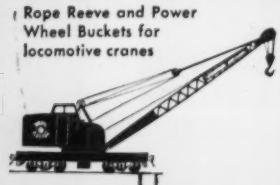
ALSO BUILDS BETTER BUCKETS

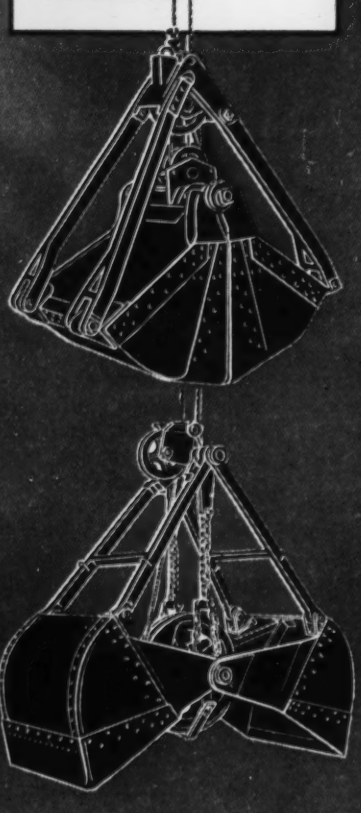
Link Type Buckets for boat unloaders, bridge cranes, fast plants





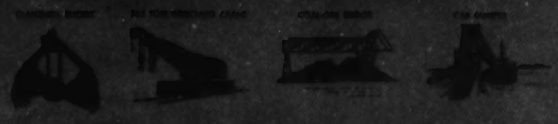
Rope Reeve and Power Wheel Buckets for locomotive cranes





Brownhoist Buckets are designed for specific jobs and especially engineered to meet the toughest materials handling requirements. They take deep, full capacity bites that move more materials per lift, thus making possible considerable savings in man-hours and production time. They are built for endurance and dependability, the same qualities that have accounted for Brownhoist leadership in the bulk materials handling field for more than three quarters of a century. Railroads, steel mills and dock operators who are loading and unloading coal, ore, slag or other bulk materials will find it pays to discuss their requirements with Brownhoist engineers.

BROWNHOIST builds better cranes



INDUSTRIAL BROWNHOIST CORPORATION • BAY CITY, MICHIGAN • DISTRICT OFFICES New York, Philadelphia, Cleveland, Chicago, Denver, San Francisco, Montreal • AGENCIES Detroit, Birmingham, Houston

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A SPECIAL REPORT ON PROTECTIVE FINISHES FOR ALUMINUM

Most aluminum producers and fabricators are well aware of the superiority of chemical finishes over anodizing for the protection of aluminum from corrosion. Naturally, then, there is a running battle for acceptance among the leading producers of the protective chemical finishes.

That's why, here at Allied, we have always studied your needs with regard to both our own and competitive processes. We're constantly trying to produce new and better finishes because we believe there's always room for improvement . . . even to our own products. Some years ago this policy led to the introduction of a process, long in development, that offered you a way to overcome anodizing's obvious technical complications . . . Iridite #14. This finish was far easier to use than anodizing, yet provided comparable, if not superior, quality. And, its cost was much less than anodizing.

But other finishes offering similar advantages over anodizing have entered the market. So . . . the current battle for acceptance. By any cost comparison Iridite #14 is the most economical. However, corrosion tests by users show contradictory results as to performance from Iridite #14 and other leading protective finishes for aluminum. Most tests show Iridite #14 superior, but some do not. The margin of difference, however, is always small. The truth is that all have proved good. However, our laboratory research indicated that still further improvements could be made.

That knowledge . . . plus our aim to give you even better protection and maintain the leadership of the industry, is exactly why Allied Development Engineers have been working for long years to develop a better finish than any of those now available, including our own Iridite #14.

Now the new finish is ready for you. It's called Iridite #14-2 (Al-Coat).

From a performance standpoint, Iridite #14-2 gives you two important advantages in the protective finishing of aluminum.

FIRST: in its fully colored brown film stage it provides corrosion resistance decidedly superior to previous processes.

SECOND: the basic brown film can be hot water bleached to produce a clear-type film with protection heretofore unobtainable from clear-type chemical finishes.

From an operating standpoint, new Iridite #14-2 gives you three important advantages.

FIRST: it provides consistently higher corrosion resistance for different aluminum alloys treated in the same bath.

SECOND: it provides a more uniform appearance for parts of different alloys and with varied surface finishes before treatment.

THIRD: its operating and technical characteristics are superior to those of other processes.

If you are using or planning to use a chemical finish for aluminum, you should have full details on new Iridite #14-2. Write us or send samples for free test processing. Or, for more immediate advice, call your Iridite Field Engineer. He's listed under "Plating Supplies" in your classified telephone book. - - - ALLIED RESEARCH PRODUCTS, INC., 4004-06 EAST MONUMENT STREET, BALTIMORE 5, MARYLAND.

P. S. Even new Iridite #14-2 will be constantly measured against both your needs and competitive processes to make sure you get the best possible, most economical finish for your product that man and the laboratory can develop.

GRAPHITAR®

current collector wheels for overhead electric cranes

GRAPHITAR current collector wheels increase operating efficiency, reduce maintenance costs and give longer service in this difficult application

Excellent conductors of electricity, GRAPHITAR (carbon-graphite) collector wheels for overhead electric cranes provide numerous advantages over ordinary metal wheels. GRAPHITAR is self-lubricating, making bushings unnecessary and completely eliminating the need for greasing. GRAPHITAR minimizes pitting, arcing and burning, thus putting an end to dead spots in the line that reduce operating efficiency. GRAPHITAR wears exceptionally well and will give longer service than ordinary metal wheels. GRAPHITAR is chemically inert and will not be affected by fumes, heat, cold, rain or snow. For complete information, write us today

OUR 100th YEAR

184

THE UNITED STATES GRAPHITE COMPANY

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Exit end of high speed tinning line.

The Wean Engineering Company, Inc., Warren, Ohio is a recognized specialist in the design and installation of sheet, tin and strip mill equipment. The expert knowledge and trained imagination of one of the world's most noted steel mill engineering firms are at your service when you specify Wean — whether the job calls for a single piece of equipment or a complete design of an entire line.

The WEAN

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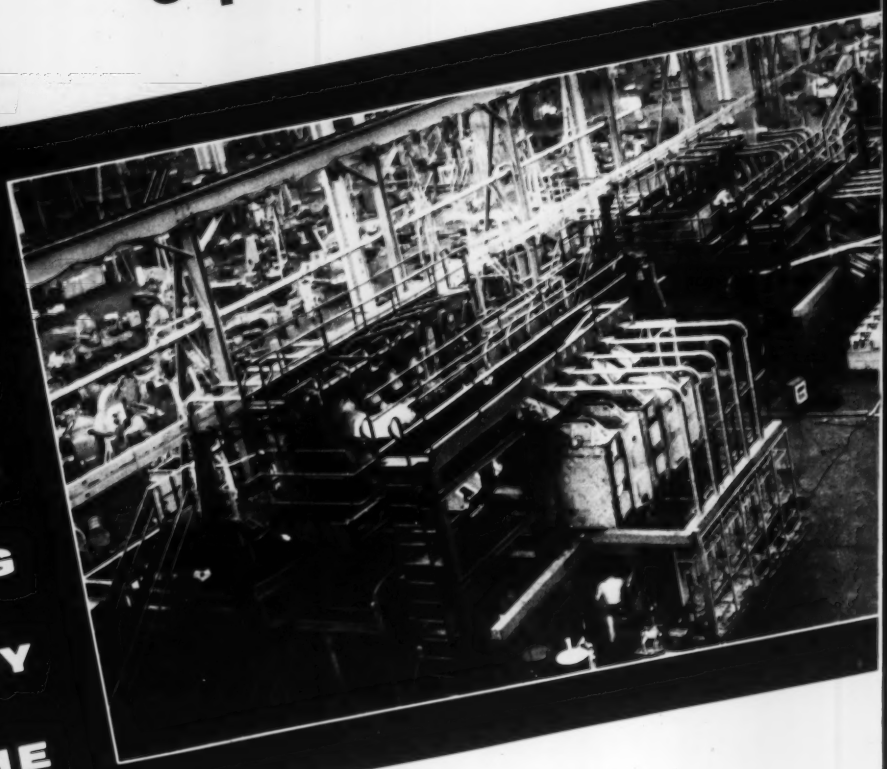
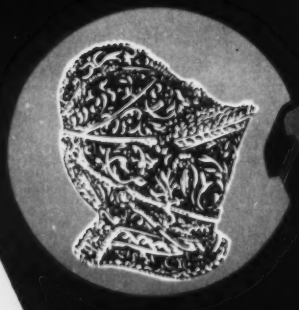
DESIGNING AND BUILDING TOMORROW'S METAL WORKING MACHINERY IS THE BUSINESS OF

Special metal working equipment . . .





Wean advanced slitting and flying shear line . . .

EQUIPMENT CORPORATION

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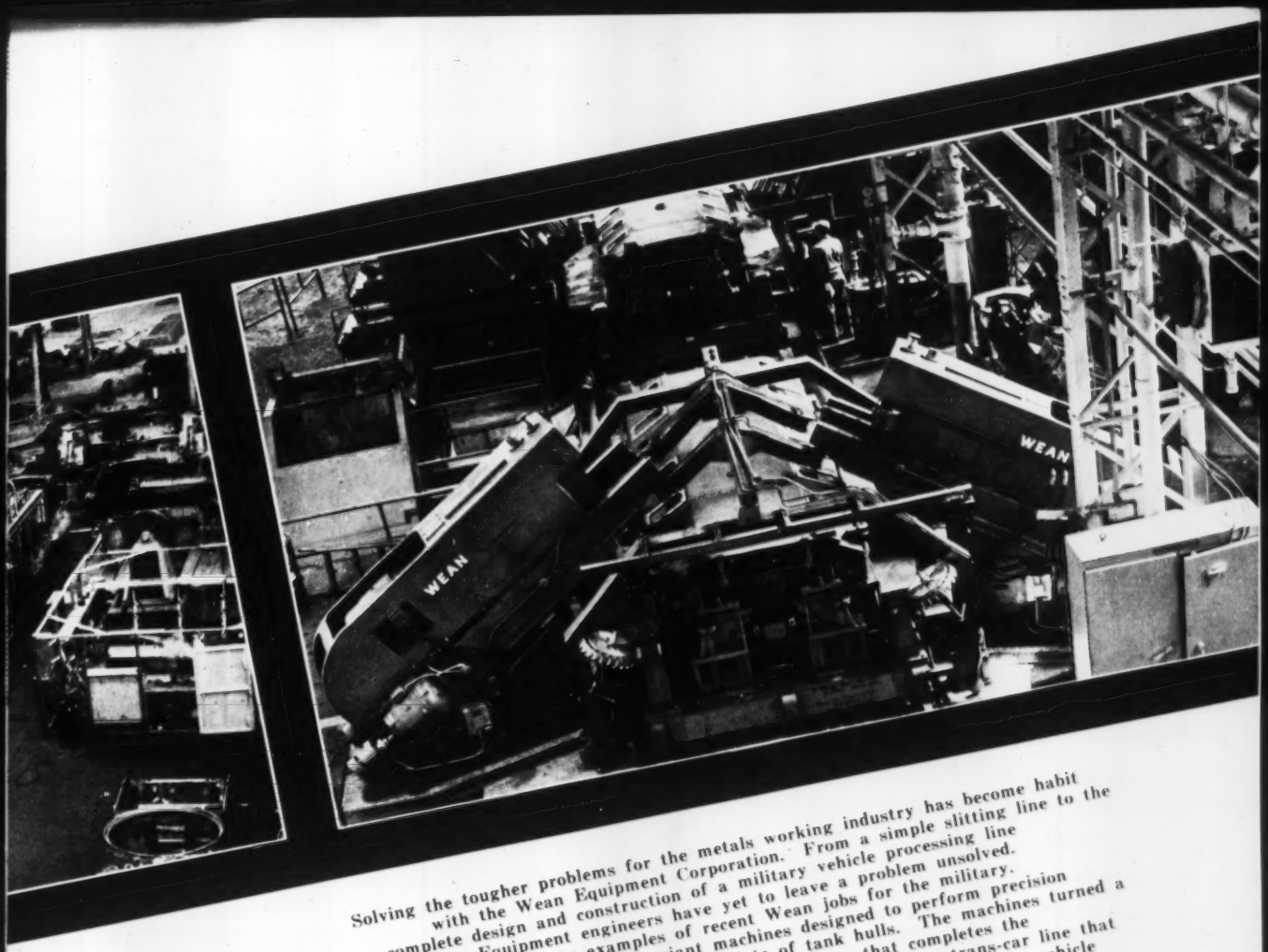
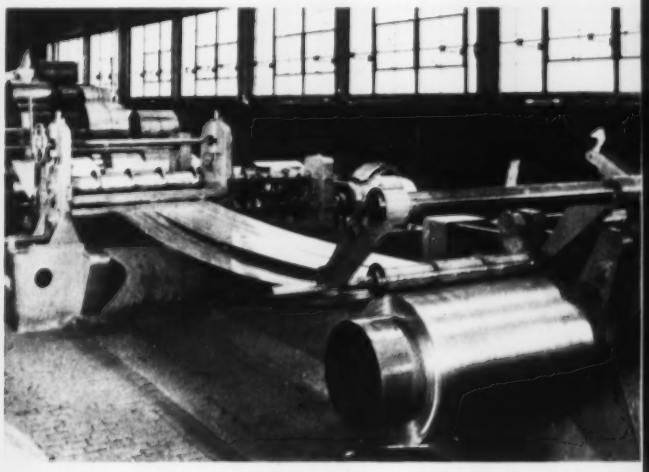


Solving the tougher problems for the metals working industry has become habit with the Wean Equipment Corporation. From a simple slitting line to the complete design and construction of a military vehicle processing line Wean Equipment engineers have yet to leave a problem unsolved.

On this page are examples of recent Wean jobs for the military. The top photograph shows two giant machines designed to perform precision grinding and drilling on the armor plate of tank hulls. The machines turned a slow, hand process into a production operation that completes the job 22 times faster. The bottom photograph is of a unique trans-car line that performs precision milling, drilling and boring operations on heavy vehicle hulls . . . at the same time solving the handling problems of these bulky pieces.

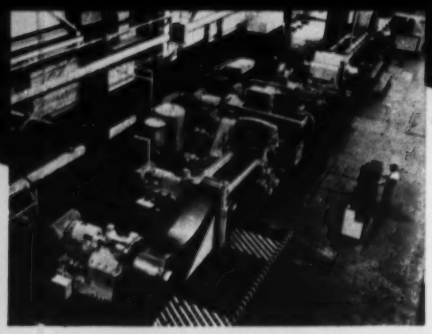
When you have a job that requires special machinery—large or small—you'll be wise to call in a Wean Equipment engineer.



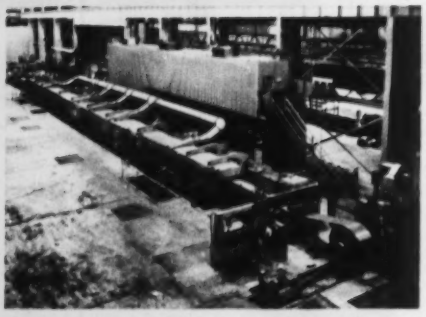
Here's the most advanced flying shear line marketed today. A line that can save you up to 20 per cent on your steel costs because it can make 100 cuts-per-minute to resquared tolerances. If you are a user of sheet steel it will more than pay you to get in touch with a Wean Equipment engineer and have him prove to you how you can order your steel direct from the mill, in coil form, eliminate expensive extras, and make a saving amounting to almost $20 per ton in your final steel costs. You can't afford to overlook this amazing new line . . . get in touch with Wean Equipment in Cleveland, Chicago or Detroit.

WEAN ENGINEERS are recognized specialists in the design and installation of sheet, tin and strip mill equipment...

Wean High Speed Electrolytic Cleaning Line



Continuous Coating Line



Electrolytic Cleaning Line

Continuous Strip Pickle Line

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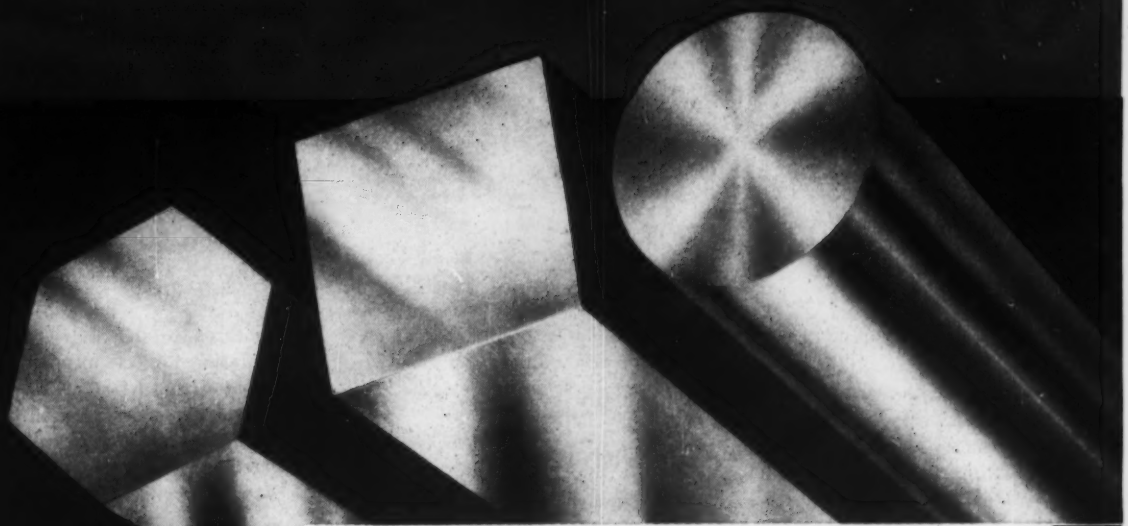
COLD FINISHED CARBON STEEL



Use "J&L 1200" steel on your tough jobs for

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__ __ in uniformity

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available in all standard shapes and sizes

It's tops

"J&L 1200" Steel provides the qualities that help machine operators do top-flight work at lower overall costs. With "J&L 1200," the operator obtains: *better machine finishes . . . longer tool life . . . higher rates of speed.* This fact has been proven time and again—in shop after shop.

"J&L 1200" grades meet the compositions published by the A.I.S.I. . . . S.A.E. . . . and Federal Specifications QQS-633.

Try this steel in your own shop. Results will convince you "J&L 1200" deserves to be a regular specification for your production runs.

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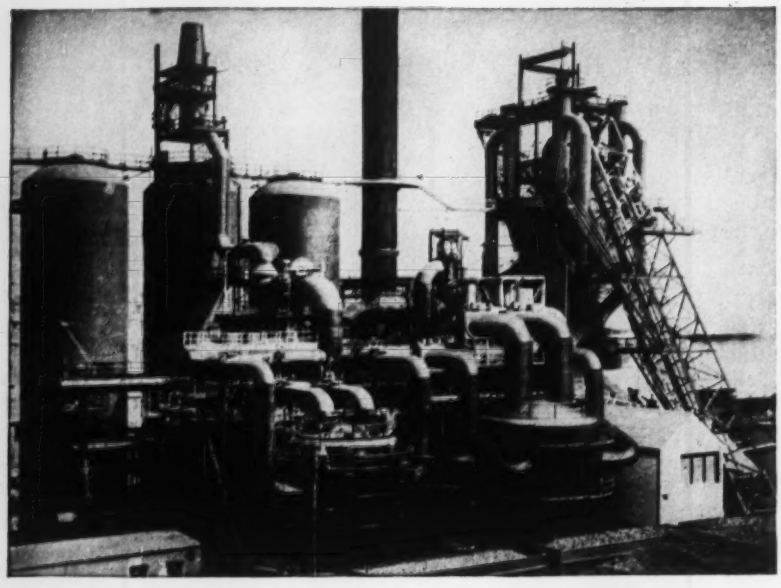


How Cottrell Precipitators Clean Gas in the Steel Industry

Iron Ore Sintering Plants

The first commercial Cottrell installation for cleaning gases coming from the iron ore sintering machines was placed in operation in 1952 with collection efficiencies exceeding 95%. In this installation the gases leaving the windboxes of the sintering machine pass to a flue, then to a mechanical collector, to the induced draft fans, to the precipitator, and then to stack. The gases enter the precipitator at temperatures of about 250 to 300F, with water vapor content of about 8%. The dust collected is dry and quite fine. The precipitators used on this application are of the horizontal steel plate type.

Iron Blast Furnaces

The cleaning plant in most iron blast furnace installations consists of the preliminary stage (dry dust catchers), the primary stage (water scrubbers) and the secondary stage (water-flushed Cottrell Precipitators). Dust and fume content of the gas is reduced to the range of 0.1 to 0.3 grains per cubic foot of gas corrected to standard conditions before it reaches the Electrical Precipitator. The function of the precipitator is to further clean this gas to a final dust content ranging in most cases from 0.005 to 0.01 grains per cubic foot, depending on how the gas is to be used.

Open Hearths

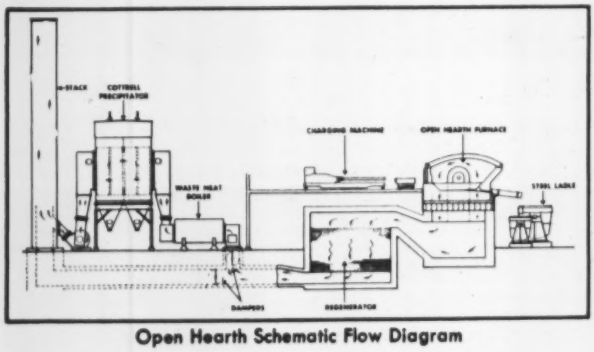
This problem involves the cleaning of combustion gases coming from furnaces, usually oil-fired, and carrying in suspension a heterogeneous mixture of very fine metallic oxides.

After extensive research and pilot plant studies, Research Corporation completed the first commercial precipitator installation for cleaning open hearth gases in 1951. Test results at rating indicated efficiencies of over 95% were obtained. Most of the time there was no visible discharge.

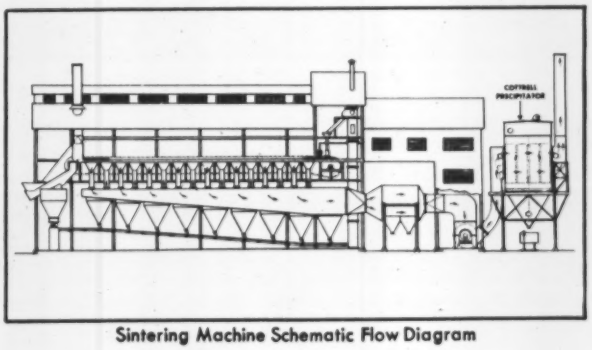
Other Steel Applications

In addition to the above, Research Corporation Cottrell installations are being used for detarring by-product coke oven gas, cleaning oven fuel gas and producer gas, and cleaning ferromanganese blast furnace gas.

Detailed information on all these applications is available through your nearest Research Corporation office.



Open Hearth Schematic Flow Diagram



Sintering Machine Schematic Flow Diagram

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RC148

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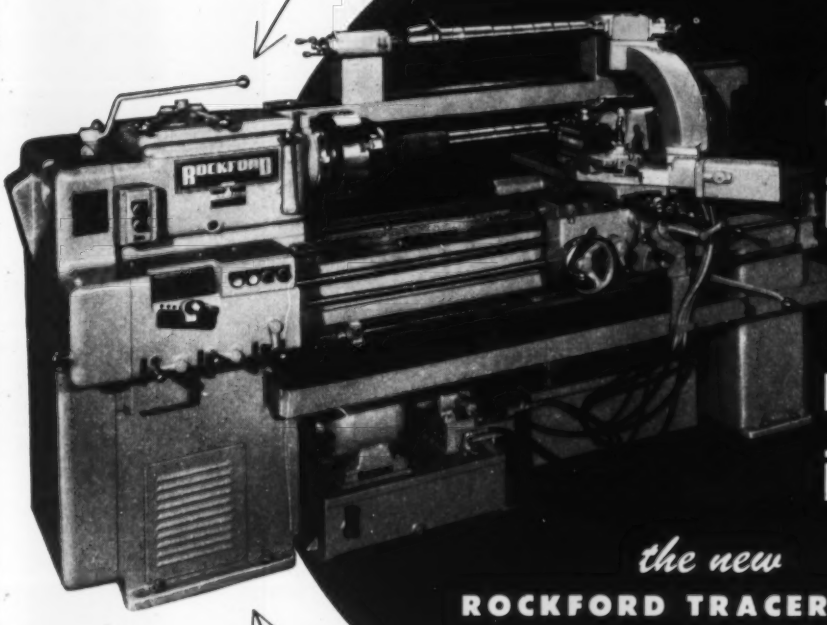

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Be sure to see this new production tool in operation. Witness the unusual accuracy and speed with which it cuts. Feel the ruggedness and power built into the Kopy Kat with the extremely sensitive feather-touch of the servo-mechanism control. Yet the cutting tool works with 400 lbs. unit pressure for positive finish and accuracy.

See your Rockford Machine Tool Co. representative today and have him arrange an appointment for you to see the new Rockford Tracer Lathe in action.

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6', 8', 10', 12' BEDS

18" Swing

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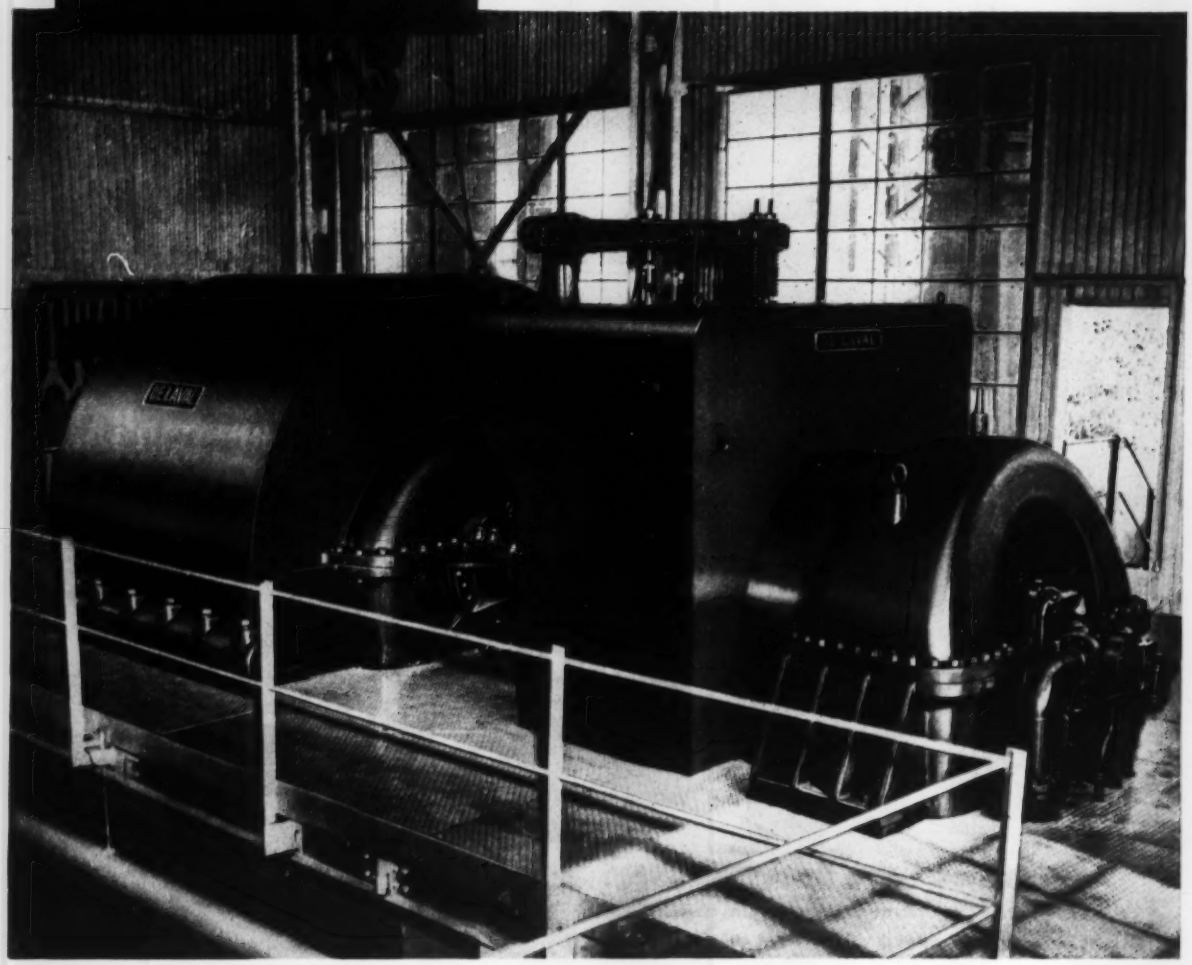
2500 KISHWAUKEE STREET, ROCKFORD, ILLINOIS

DE LAVAL CENTRIFUGAL BLOWER

delivers 75,000 cfm for southern steel mill



This De Laval 75,000 cfm blast furnace blower in a southern steel mill is driven by a 9,450 hp De Laval turbine operating at 2,900 rpm. Discharge pressure of the blower is 35 psig.

De Laval blowers have what it takes to give long service. The rugged casings and sturdy, perfectly balanced rotors are built to take punishment. The pressure lubricated sleeve bearings and Kingsbury type thrust bearing add durability and reduce maintenance. Both the turbine and blower are De Laval-designed and De Laval-made for top performance.

De Laval centrifugal blowers and compressors are built in single and multi-stage types to supply air in volumes up to 150,000 cfm for all classes of service in steel, gas and coke plants. The wealth of application experience acquired by De Laval over the years assures a correct and economical solution to your blower problem. Consult your De Laval Sales Engineer.

DE LAVAL *Centrifugal Blowers*

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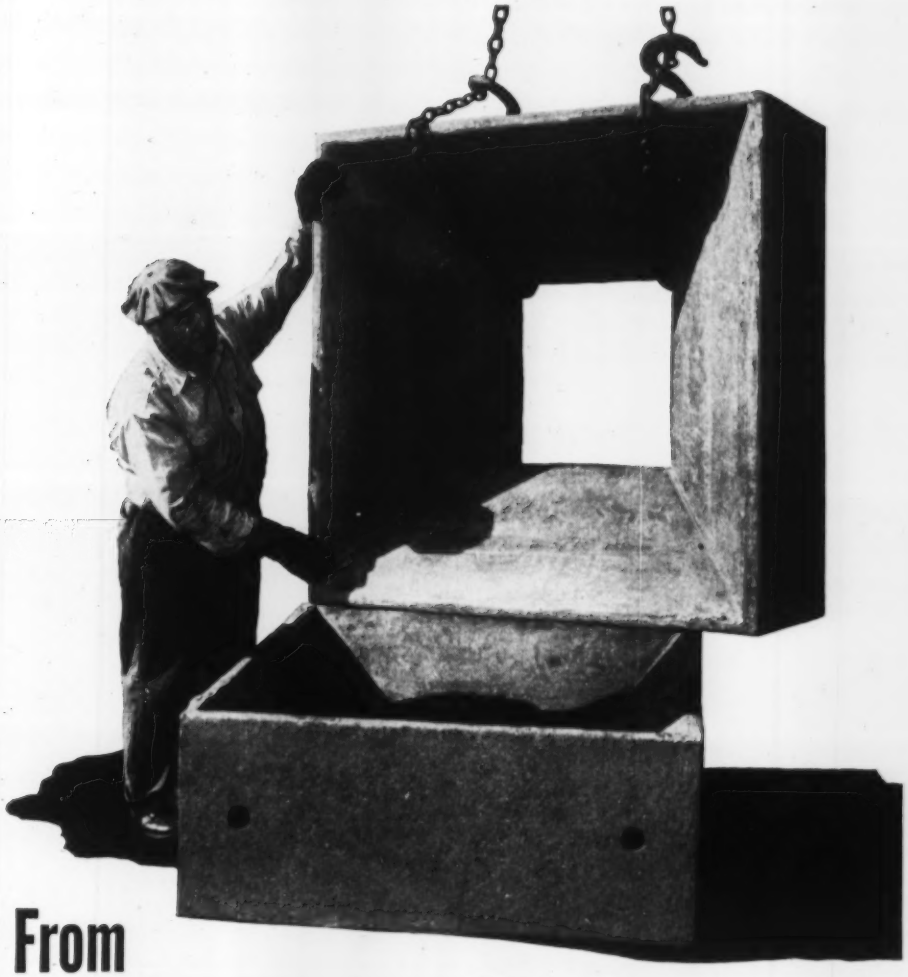

Chills Cast From Chateaugay Pig Iron Resist Heat at 3400°F

Casting surfaces resistant to heat and corrosion are extremely important to Dobbie Foundry & Machine Company, Niagara Falls, N. Y.

The casting illustrated is a chill or trough. It is used to direct the flow of molten chromium into molds. The casting surfaces must withstand temperatures over 3400° F.

To obtain surfaces resistant to such heat, Dobbie uses Chateaugay, Republic's exclusive premium Pig Iron, in its cupola mixture.

Resistance to heat and corrosion are only two of many benefits foundrymen enjoy with Chateaugay. It also produces an unusually fine and uniform grain structure with high wear resistance. Chateaugay castings machine beautifully and economically. Chateaugay shrinks evenly, fills adjoining light and heavy sections completely.

For the complete story on Chateaugay, the low-phosphorous, copper-free Pig Iron, call in a Republic Pig Iron Metallurgist. He has all the facts. He can show you how to obtain high strength, uniformity and machinability throughout every casting.

Just let us know when you would like him to call.

REPUBLIC STEEL CORPORATION

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REPUBLIC PIG IRON

REPUBLIC STEEL

Do your machines have a built-in FUTURE?

LEES-BRADNER Model 7-HD
HEVI-DUTY HOBBING MACHINE
Rated capacity in steel 4 D. P.
Capacity between centers 25"
Maximum Hob Size 4"x4"
Max. dia. capacity with 4" hob 7"
Max. dia. capacity with 3" hob 8"
Axial shift of hob 3"
Weight 9,300 lbs.

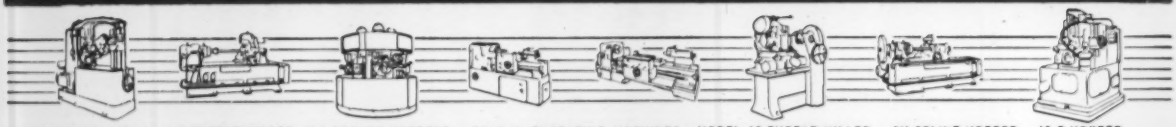
Yesterday's machines were engineered for yesterday's requirements. But the pace of modern industry has changed. The machines you bought yesterday are hard-put to meet today's production demands. They may need replacement.

When you buy your new machine, gear your thinking to the future. Meeting today's production needs is not enough—your machine *must* have a built-in future. It must be engineered to fit tomorrow's production picture, TODAY!

The Lees-Bradner Company manufactures a complete line of hobbing machines that are designed to meet varied requirements. For example, the new 7-HD, Hevi-Duty Vertical Production Hobbing Machine is built to hob *today* at tomorrow's higher feeds and speeds. It's a heavier, more powerful machine equipped to meet industry's demands for savings in time and labor. It has a built-in future, a reserve capacity to produce for today's industry *and* tomorrow's, as well. Your Lees-Bradner representative will be glad to give you the facts. Or, write us direct.

The LEES-BRADNER Company

CLEVELAND 11, OHIO, U.S.A.



MODEL R HOBBER · HT THREAD MILLER · 7-A ROTARY HOBBERS · CRI-DAN THREADING MACHINES · MODEL 40 THREAD MILLER · 8H SPLINE HOBBER · 12-S HOBBER

IF YOU THREAD OR HOB . . . GET A BETTER JOB WITH A LEES-BRADNER

CATERPILLAR®

Demands Top-Notch Quality in All Machinery Parts...

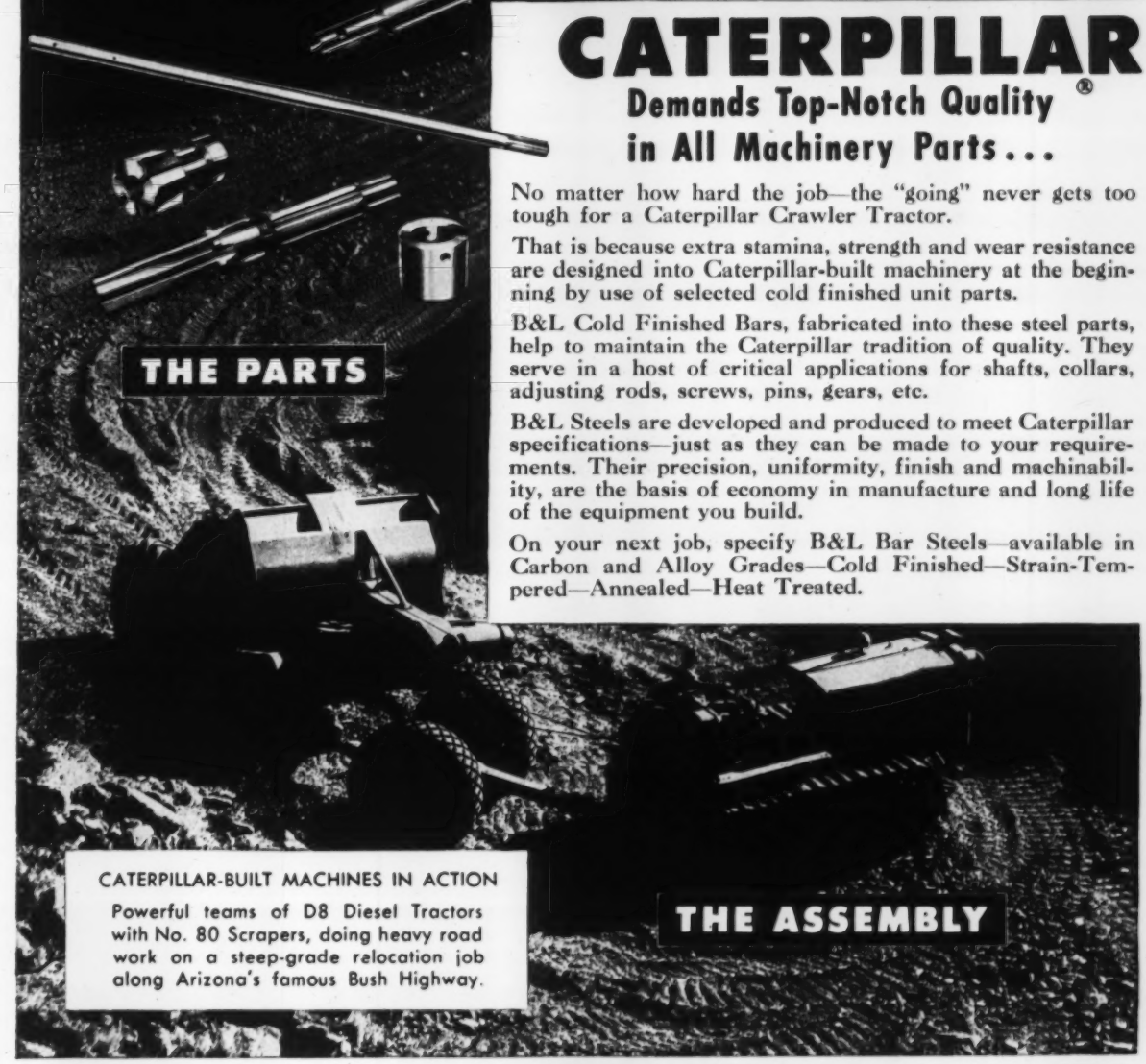
No matter how hard the job—the "going" never gets too tough for a Caterpillar Crawler Tractor.

That is because extra stamina, strength and wear resistance are designed into Caterpillar-built machinery at the beginning by use of selected cold finished unit parts.

B&L Cold Finished Bars, fabricated into these steel parts, help to maintain the Caterpillar tradition of quality. They serve in a host of critical applications for shafts, collars, adjusting rods, screws, pins, gears, etc.

B&L Steels are developed and produced to meet Caterpillar specifications—just as they can be made to your requirements. Their precision, uniformity, finish and machinability, are the basis of economy in manufacture and long life of the equipment you build.

On your next job, specify B&L Bar Steels—available in Carbon and Alloy Grades—Cold Finished—Strain-Tempered—Annealed—Heat Treated.



CATERPILLAR-BUILT MACHINES IN ACTION

Powerful teams of D8 Diesel Tractors with No. 80 Scrapers, doing heavy road work on a steep-grade relocation job along Arizona's famous Bush Highway.

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SALES OFFICES IN ALL PRINCIPAL CITIES

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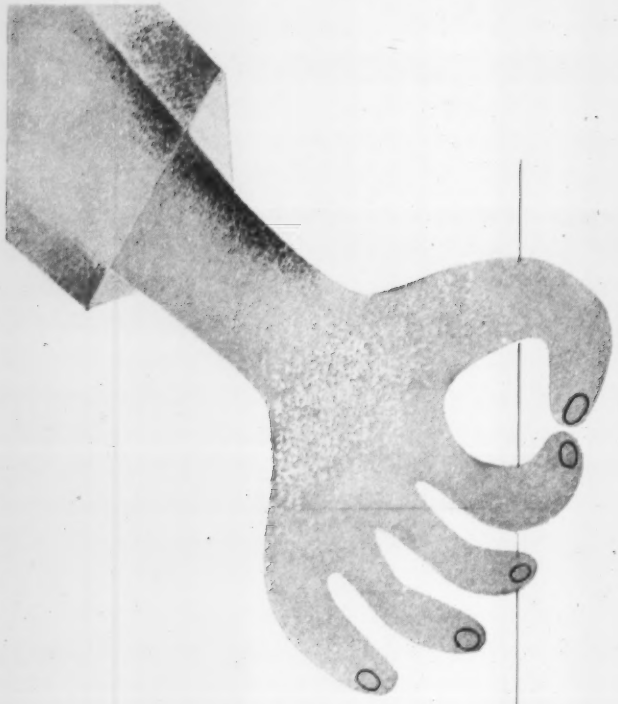
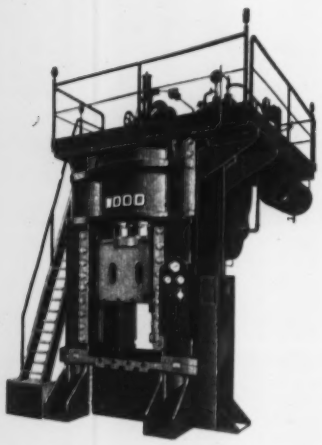


Ever measure a pinch of salt?

IN METALWORKING, THE PAYOFF'S AT AN R. D. WOOD PRESS LIKE THIS ONE!

This 2000-ton heavy duty, self-contained hydraulic forming press is used for continuous service on such operations as hot forging, forming, coining and forcing. R. D. Wood hydraulic presses are made in a full range of sizes and capacities, for many uses. Ask for catalog, and for engineering aid—both yours without obligation.



It is to be doubted whether even the most expert chef can tell the capacity of his own pinch of salt. And yet, he has a fine flair for flavor—an art which never fails him. On the other hand, in the business of making capital investment machinery such as hydraulic presses, R. D. Wood Company cannot use the pinch as a means of measurement. We have to rely on highly technical procedures. However, there *is* an art here which compares with the chef's. It's the art that comes only from having done the same thing many times before . . . sizing up a manufacturer's production need . . . building a press to meet that need . . . and doing the job so well that he never has the same problem again. We're holding an illustrated catalog for you. Please, send for it.

R. D. WOOD COMPANY

PUBLIC LEDGER BUILDING • PHILADELPHIA 5, PENNSYLVANIA

Representatives in Principal Cities

MAKERS OF HYDRAULIC PRESSES AND VALVES

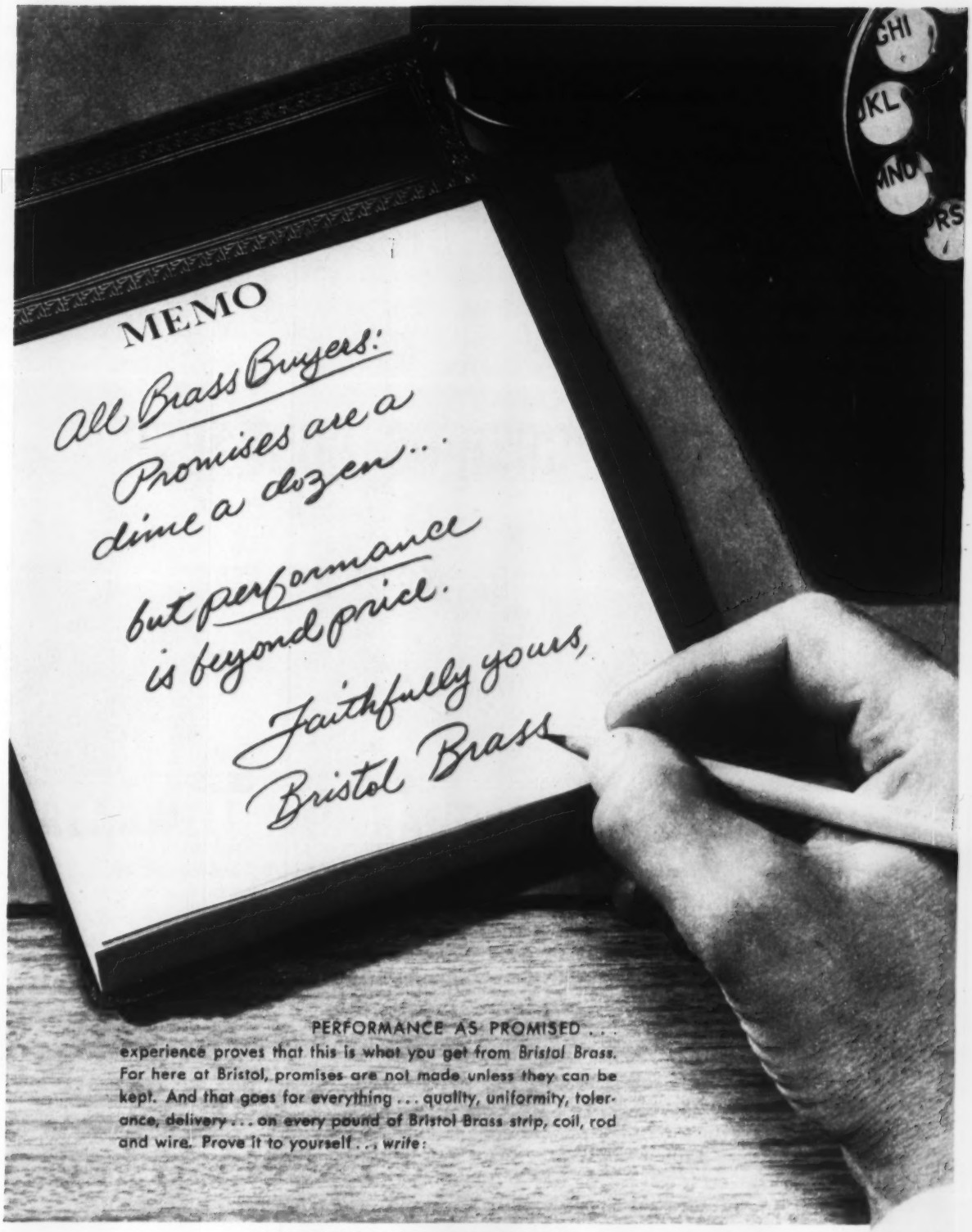
FIRE HYDRANTS

CAST-IRON PIPE

GATE VALVES

GAS PRODUCERS

ACCUMULATORS



PERFORMANCE AS PROMISED . . .

experience proves that this is what you get from Bristol Brass. For here at Bristol, promises are not made unless they can be kept. And that goes for everything . . . quality, uniformity, tolerance, delivery . . . on every pound of Bristol Brass strip, coil, rod and wire. Prove it to yourself . . . write:

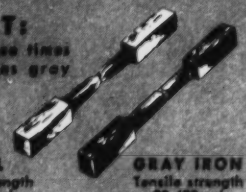
THE BRISTOL BRASS CORPORATION

has been making Brass strip, rod and wire here in Bristol, Connecticut since 1850, and has offices and warehouses in Albany, Boston, Buffalo, Chicago, Cleveland, Detroit, Milwaukee, New York, Philadelphia, Providence, Rochester, Syracuse. The Bristol Brass Corporation of California, 1217 East 6th St., Los Angeles 21. The Bristol Bras Corp. of Ohio, 1607 Broadway, Dayton.

"Bristol-Fashion" means **Brass at its Best**

FACTS THAT FIGURE in lower costs

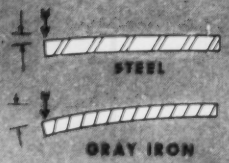
FACT: Steel is three times as strong as gray iron.



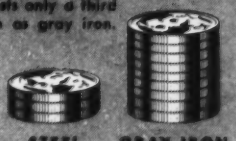
STEEL Tensile strength 61,900 psi

GRAY IRON Tensile strength 20,420 psi

FACT: Steel is two and one half times as rigid as gray iron.

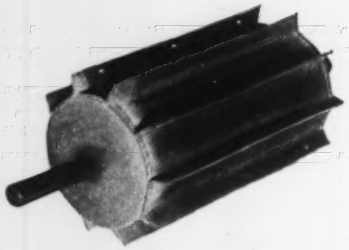


FACT: Steel costs only a third as much as gray iron.



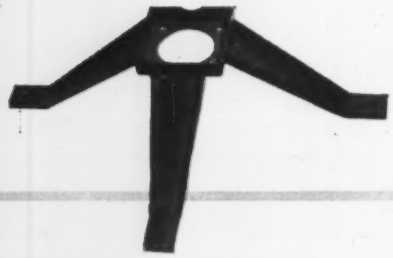
AND SO... *by manufacturing your products from welded steel, costs can be reduced up to 50%.*

Why steel designs cost less



COSTS 45% LESS

Feeder roll is built from standard channel welded to steel discs. Steel design eliminates breakage, weighs half of former casting. Saves 45% on cost of manufacture.



COSTS 30% LESS

Machine bracket is welded from 10 gauge metal. Weighs half of original cast design. Cut is stronger, more rigid. Costs 30% less to produce.

HOW YOU CAN CUT COSTS...NOW

BECAUSE steel is stronger, more rigid than iron, yet costs a third as much per pound, costs on many products can be cut up to 50%.

You can realize savings like these on your designs, on products you manufacture, without disrupting production. Simply change over your designs one part at a time.

A Lincoln representative will gladly work with you to save your time. He can show you how to simplify design details and cut costly production man-hours. Call him.

Cuts design costs

WELDesign manual shows how to convert designs to welded steel with minimum design time. Available to product engineers and designers for home study at nominal cost. Write . . .

THE LINCOLN ELECTRIC COMPANY

DEPT. 1612, CLEVELAND 17, OHIO

THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT

Treadwell

TREADWELL MERCHANT, BAR & BILLET MILLS

Including Cooling Beds such as the 460′ double escapement bed indicated above, which is in successful operation serving a 16″, 14″, and 10″ continuous merchant and bar mill.

Manipulators, Mill, etc.
Mills, Blooming & Billet
Mills, Merchant & Bar
Mills, Rod
Mills, Sheet
Mills, Strip (Cold)
Mills, Strip (Hot) & Skelp
Mills, Vertical Edging
Tables, Mill

Tables, Tilting & Lift
Tables, Transfer
Transfers

Coilers & Reels
Conveyors, Coil
Drives
Ejectors, Furnace
Gauges, Shear, Saw, etc.

Beds, Cooling
Beds, Inspection
Bumpers, Furnace
Pushers, Furnace
Repeaters
Handling Equipment (Kick-offs, Pilers, Cradles, etc.)
Steel and Iron Castings
Ni-Hard and Ductile Iron Castings

Treadwell Engineering Company

EASTON. PA.

SALES AND ENGINEERING OFFICES:

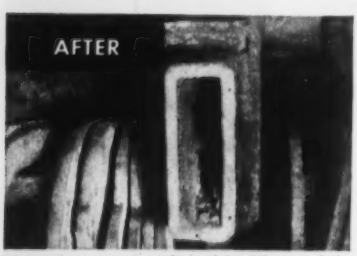
208 S. LA SALLE STREET
CHICAGO 4, ILL.
CEntral 6-9784

140 CEDAR STREET
NEW YORK 6, N. Y.
WOrth 4-3344

1015 FARMERS BANK BLDG.
PITTSBURGH 22, PA.
ATlantic 1-2883

Cut Mold Core Cleaning Time 2/3 by Powder-Lancing

Typical conditions of splashed metal, sand, and slag which have penetrated this ingot mold core.



This job was accomplished in 8 hrs., while previous lancing methods required up to 30 hours.

The time required to clean away splashed metal, sand, and slag which have penetrated these ingot mold cores has been cut from 30-hrs. to 8 by powder-lancing.

The speed of powder-lancing enables a steel mill to cut labor costs by more than ⅔, and reduce the consumption of lance pipe to less than ½ that ordinarily required.

In powder-lancing, a powdered metal is added to the oxygen lance process which raises its "flame" temperature, and increases the rate of melting or oxidation in the material being lanced.

A powder-lance can pierce holes in many materials that resist a standard oxygen lance. Blast furnace refractory, concrete, cinder blocks, fire brick, aluminum billets, steel and cast iron containing inclusions, and sand and metal incrustations—all yield quickly and easily to powder-lancing.

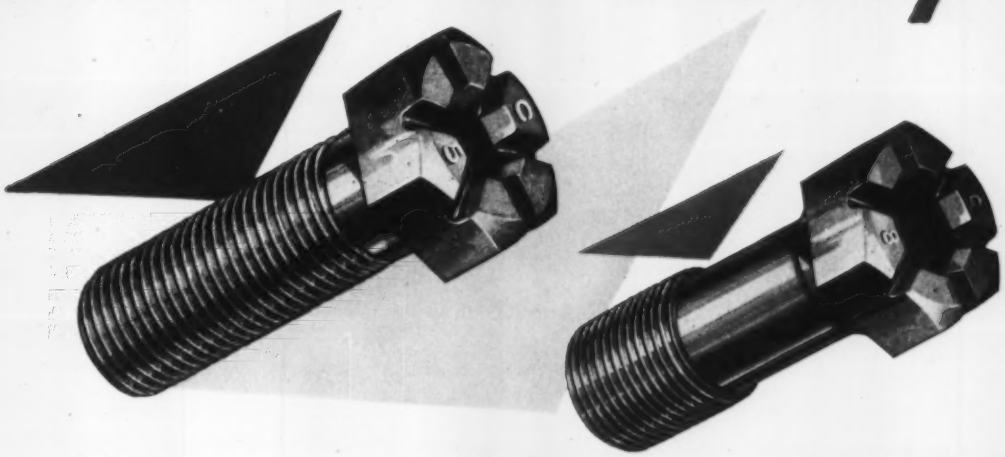
Powder-lancing is helping to speed production and maintenance in mills throughout the country. LINDE service engineers will be glad to help you determine the latest, most efficient setups for any lance operation. Call your local LINDE representative for more information. Save time and money, call him today.

LINDE AIR PRODUCTS COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York, 17, N. Y.
Offices in Other Principal Cities
In Canada: DOMINION OXYGEN COMPANY
Division of Union Carbide Canada Limited, Toronto

Linde Trade-Mark

"Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.

Which is the CleCap?



...both are—all types and sizes of the vibration-proof Place Bolt

Place Bolts are used in all types of automotive and farm equipment, for example—in fly wheels, main bearings, connecting rods and other high vibration points.

Be sure you don't overlook the definite advantages of this *one-piece self-locking* fastener where you have a vibration problem—the *tough strength* developed by cold-forging, and the *economy of assembly* (elimination of locking devices and no limit to the number of times the Place Bolt may be re-used). Saves weight, saves space, saves time.

Licensed under U. S. Patent No. 2543705, CLEVELAND has facilities for mass production of sizes ranging from ¼" to 1¼" diameter, standard or special shanks, in carbon (C-5) or alloy (C-8) steel.

Write for guide chart for calculating wrench torques for "Place" type bolts.

The Cleveland Cap Screw Co.

2935 EAST 79TH STREET • CLEVELAND 4, OHIO
VU Ican 3-3700 TWX CV42

CLEVELAND *Top Quality* FASTENERS

Ferrous and Non-Ferrous: Bright, High Carbon and Alloy Steel Heat Treated, Brass, Silicon Bronze, Stainless Steel

Hex Head Cap Screws—¼" to 2½" dia.
Socket Head Cap and Set Screws—Plain and Knurled: ¼" to 1½" dia. Also Flat and Button Head Styles
Flat Head Cap Screws—¼" to 1" dia.
Fillister Head—¼" to 1¼" dia.
Set Screws—Square Head—¼" to 1½" dia.
Milled Studs—¼" to 1¼" dia.
Place Bolts—¼" to 1¼" dia.
Structural Bolts to ASTM Specification A325
Tractor Bolts
Special Hot and Cold Headed Parts

Facilities to make larger diameters than listed

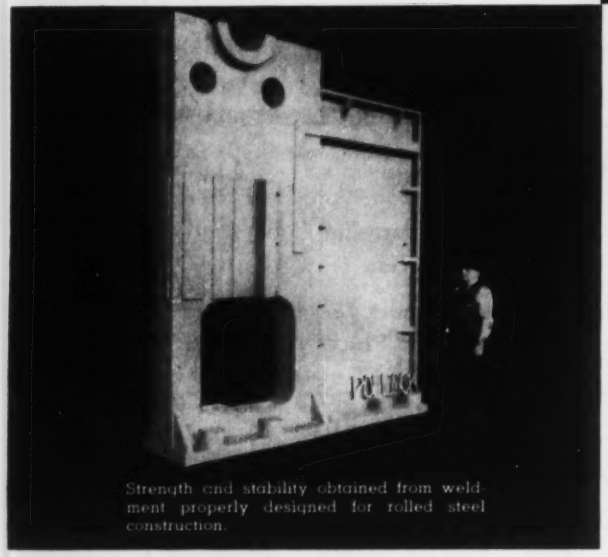
Originators of the Kaufman DOUBLE EXTRUSION Process

Complete Facilities

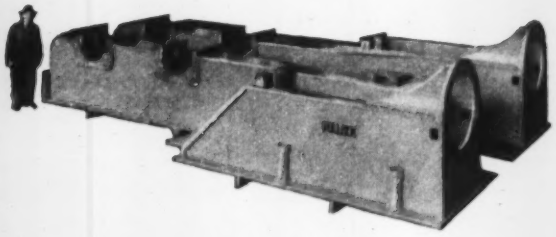
for all steel plate fabrication and erection

Intricate light gauge steel construction requiring precision fitting.

Complicated pipe connection including carefully fitted hi-carbon liner plates.



Strength and stability obtained from weldment properly designed for rolled steel construction.



Heavy weldment replacing steel casting, making better job and with considerable savings.

BLAST FURNACES • HOT METAL CARS AND LADLES
CINDER AND SLAG CARS • INGOT MOULD CARS
CHARGING BOX CARS • WELDED OPEN HEARTH LADLES

Your steel plate work of all kinds is in safe hands at The William B. Pollock Company. Pollock methods, machines and men have served the steel industry since 1863.

Pollock's modern production techniques and experience help cut your costs on all steel plate work. Precision machines are employed in forming, flame cutting, welding and machining plate from ¼" to 7" thick. If your weldments have finished surfaces or are joined to machined castings, Pollock can do the entire job for you . . . we are prepared to erect in the field the steel we fabricate. Your inquiries are invited.

STEEL PLATE CONSTRUCTION • ENGINEERS • FABRICATORS • ERECTORS

THE WILLIAM B. POLLOCK COMPANY

Since 1863

YOUNGSTOWN, OHIO

"Me Switch? ...Never!"

"OK! SO I AM PIG-HEADED! I gave up trying other ropes years ago. It pays me to standardize on Roebling. Why? Well, with Roebling I get exactly the type of rope I need, when and where I need it . . . no makeshifts . . . no delays . . . and the performance is tops."

* * *

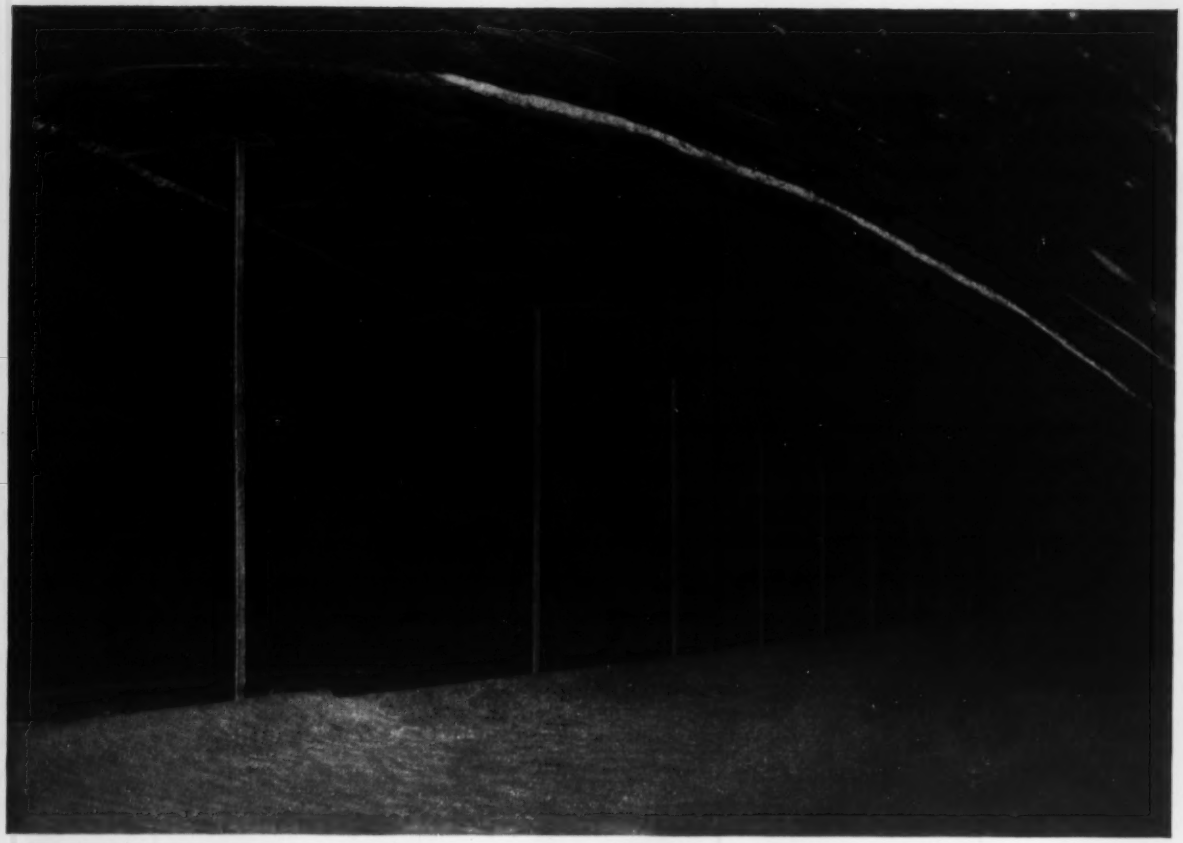
Why not find out for yourself? Call your nearest Roebling office or distributor for a Field Man. He'll recommend the ropes that perform and stand up best in the industrial field. And you'll learn what service really means!

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J.

BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13325 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.



Tunnel within a tunnel — 8500-ft. exhaust ducts along the top of each Holland Tunnel tube are supported in the center by 7-ft. lengths of 2½-inch by ⅜-inch hot-rolled Monel flats. These hangers are installed every 8 feet.

The Holland Tunnel that drivers never see

How it's supported by corrosion-resisting Monel hangers

Drivers never see *this* tunnel because it is hidden above the ceiling of the Holland Tunnel.

This tunnel-within-a-tunnel provides a unique air exhaust system that completely changes the air in the Tunnel every minute and a half. Since the Holland Tunnel was opened in 1927, it has proved so successful that designers of the Lincoln Tunnel and other large tunnels have followed the same design.

In working out this unique exhaust system, Port of New York Authority engineers faced the problem of providing support for the tunnel ceiling (the exhaust duct floor). In order to minimize wind resistance, center support members or hanger rods from the cast iron tunnel shell to the ceiling had to be as thin as possible.

Monel flats provided the answer. The high strength of Monel and its corrosion resistance enabled the engineers to use hangers of minimum cross-section without requiring any allowance for corrosion.

A recent check showed these Monel hangers to be in as good condition as when installed. *No corrosion after 27 years, despite dampness and the continuously high concentration of corrosive engine fumes in the exhausted air.*

When *you* have a design problem involving corrosion and other destructive conditions, one of the Inco Nickel Alloys like Monel usually permits you to insure long service and, at the same time, to limit weight and bulkiness.

Inco has a concise booklet on the widespread applications of Inco Nickel Alloys. It's titled *Standard Alloys for Special Problems.* An exceptionally handy booklet for designers, it gives an overall picture of casting, joining, forms available and properties. It also refers to more detailed literature available on each subject. And it's yours for the asking, so why not write for it today.

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street New York 5, N. Y.

INCO TRADE MARK **Nickel Alloys**

MONEL® • "R"® MONEL • "K"® MONEL • "KR"® MONEL
"S"® MONEL • INCONEL® • INCONEL "X"®
INCONEL "W"® • INCOLOY® • NIMONIC® Alloys
NICKEL • LOW CARBON NICKEL • DURANICKEL®

STEEL
November 15, 1954

Metalworking Outlook

UAW Local Sounds Off

UAW Local 600 at Ford Motor Co. will demand a guaranteed annual wage, a 30-hour week with 40-hour pay and a wage increase in 1955. The local's president, Carl Stellato, is often at odds with UAW Chief Walter Reuther, but in this case the demands probably hew closely to the UAW policy for next year. The 30-hour week issue is likely to be only a talking point, at least Mr. Reuther has hinted that he won't press for it in 1955. The big issue will be the guaranteed annual wage. Ford's contract expires next September.

Ford, GE Revise Pension Plans

Ford has revised its retirement plans. Those retirees whose pensions are based on the formula of $125 per month, including Social Security, will receive the full benefit of Social Security increases voted by the last Congress. Nearly 1200 retired Ford employees are affected; their boosts will range from $5 to $13.50 a month. General Electric Co. is also planning to waive the provision in its pension program which allows it to include Social Security benefits in computing certain minimum retirement payments. So, all of GE's 14,000 pensioners will continue to get the same company payments, plus higher Social Security checks.

Pensions and Social Security

Commerce & Industry Association of New York reveals that no changes are planned in 141 of 209 pension programs studied, despite the Social Security changes. Some 26 are definitely going to be modified, and alterations are being considered for 42 more. The trend in pension negotiations is to divorce the Social Security benefits from pension plans in calculating payments. Watch for it to pick up still more momentum in 1955.

A Job for Machinery Rebuilders

Machinery rebuilders can expect some welcome business from Army Ordnance. A substantial number of its machine tools are to be rebuilt. The Chicago Depot will be used as a testing area, and contracts will be let soon in other areas. Machinery Dealers National Association, whose members are dealers and rebuilders of used equipment, reports that 92 of its reporting companies had sales of $14.9 million in the first nine months, 24 per cent below those in the same period last year. Sales have been going down for several years—from $35.4 million in 1951 to $29.0 million in 1952 to $25.4 million in 1953.

Capital Outlays: $60 Billion by 1975

By 1975 installations of business plant and equipment may rise as high as $60 billion, in terms of 1953 dollars. Machinery & Allied Products Institute believes that current annual capital expenditures of about $26.7

Technical Outlook—p. 127 Market Outlook—p. 201

billion are not excessive. MAPI and other analysts predict another wave of large capital expansions beginning in the 1960s.

Paradox in Steel Freight

Interstate Commerce Commission hearings which began Nov. 9 might bring higher rail rates on steel products even though the railroads don't want them. Such a paradox could come to pass if the ICC rules that the lower rail rates put into effect earlier this year are forcing enough truckers out of the steel haulage business to endanger national defense.

New U.S. Transport Policy?

Commerce Secretary Sinclair Weeks will report this month on recommendations for a national transportation policy. Many transport people hope his committee will suggest ways to resolve such dilemmas as the railroad-truck steel rate dispute. But miracles are unlikely. Even among railroaders there's no unanimity on what should be done to boost rail earnings. Pennsylvania Railroad spokesmen are favoring government subsidies, but the Association of American Railroads, which supposedly represents Pennsylvania and all other roads, still is strongly antisubsidy.

Dust on Price Controls

Washington's price control planning has been suspended. Glenwood J. Sherrard, Boston hotel owner, has resigned as assistant director for stabilization at the Office of Defense Mobilization. ODM hasn't the money or the staff to implement price control planning on a substantial scale. So, most of the more than 600 price regulations which were issued during the Korean war will continue to gather dust in their pigeonholes.

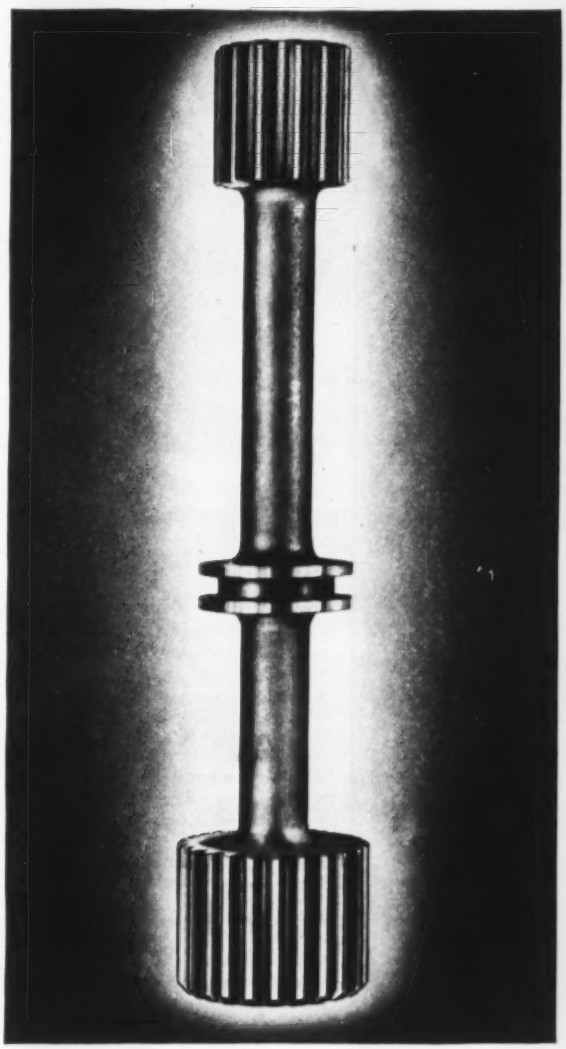
Straws in the Wind

A Swiss processor of condensed milk is putting part of its output into aluminum cans and expects to use nothing but aluminum soon . . . An electronic device for directing guided missiles is being used by the Union Pacific Railroad to direct freight cars at its North Platte, Nebr., yard . . . English Electric Export & Trading Co. Ltd. will supply two generators on a $1.1-million contract for the Table Rock Dam on the Missouri-Arkansas border; the bid, including import duties, was 11.8 per cent under the lowest offer by an American company.

This Week in Metalworking

Electronics manufacturers expect a 50 per cent increase in sales by 1960, to bring the industry's volume to $12 billion (p. 85) . . . Will your 1954 financial report be well presented and readily understood? (p. 87) . . . Company planes are proving to be the magic carpet for busy executives (p. 88) . . . Pumpmakers are priming for more business in 1955 (p. 89) . . . Thanks to long-term planning and action by private enterprise, iron ore supplies will be adequate for decades to come (p. 91) . . . Teamwork pays dividends for Western Machinery's Ralph Utt (p. 95) . . . Atoms are activating a new radiation instrument industry (p. 96).

RESISTS FATIGUE 3 TIMES AS LONG AS RUNNER-UP IN TEST



Here's a case where Armco 17-4 PH Stainless Steel solved a fatigue problem in a vital hydraulic pump shaft for military aircraft use. Under accelerated fatigue tests the shaft made of Armco 17-4 PH lasted 30 hours. The next best metal in the identical test was a non-ferrous alloy. It lasted nine hours. Shafts of 4140 alloy steel and Type 440-C stainless steel lasted less than one hour.

Many other metals were tried but it took a special stainless steel, Armco 17-4 PH, to meet the mechanical requirements of rapidly changing loads, fast acceleration and deceleration.

WHAT ARMCO 17-4 PH OFFERS

Armco 17-4 PH is a precipitation-hardening stainless steel of good corrosion resistance. It can be fully hardened after fabrication by holding at 850 to 900 degrees F for 1 hour and air cooling.

Because of the low-hardening temperatures, Armco 17-4 PH can be finish-machined in the annealed condition without allowance for scaling or distortion in heat treatment. Machining speeds are the same as for Type 410 (BHN 280-320), while in the hardened condition, Armco 17-4 PH can be machined at 60 per cent of Type 410 speeds. In both cases, finish is excellent.

WRITE FOR INFORMATION

Armco 17-4 PH is produced in billets, bars and wire. Then too, there is the double heat-treatment precipitation-hardening grade known as Armco 17-7 PH. It is supplied in sheets, strip, plates, bars and wire. Write us for complete information on both of these grades.

ARMCO STEEL CORPORATION

4484 CURTIS STREET, MIDDLETOWN, OHIO

ARMCO

SHEFFIELD STEEL • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

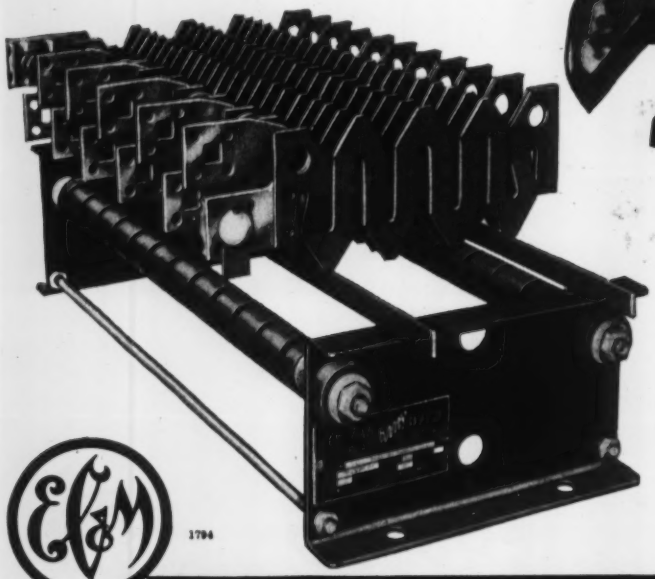
Hands Off!

EC&M TAB-WELD RESISTORS REQUIRE MINIMUM MAINTENANCE

Only EC&M TAB-WELD Plate Resistors are both bolted and welded for constant current path. Unlike other resistors, they do not require periodic tightening of clamping nuts to compensate for loss of pressure caused by alternate heating and cooling. In TAB-WELD Resistors, grids are offset and mating ends spot welded. Tap-plates are also welded into place at close intervals along the grid assembly.

This exclusive EC&M construction offers these outstanding advantages: (1) stabilized ohmic value, (2) no burning at grid-eyes or at tap-plates, (3) easy tap-shifting for best motor performance, and (4) long life with negligible service.

So . . . hands off EC&M TAB-WELD Plate Resistors . . . they are constructed for dependable performance on heavy duty motor applications . . . with minimum maintenance!



1794

CHECK THESE ADVANTAGES!

- Nonbreakable
- Corrosion-resistant alloy steel
- Negligible resistance change between cold and maximum working temperatures
- Offset resistor ends spot-welded
- No burning at grid eyes
- No burning at taps
- Small adjustments in resistance value easily made
- Insulating spacers remain dimensionally stable
- No periodic tightening of clamping nuts
- All standard sections same size
- Double insulation to ground
- Fast connection to any tap plate

Write today for illustrated Bulletin No. 942-B for complete data on EC&M TAB-WELD Resistors.

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79TH STREET • CLEVELAND 4, OHIO

EARL L. SHANER
1890-1954

Wednesday, Nov. 10, 1954, appeared to be just another day in the life of Earl L. Shaner, STEEL's editor-in-chief. After writing editorials with his stub pencil, he left the Penton building at 11:30, bought two newspapers and went to his favorite restaurant to lunch. Sitting there alone, he adjusted his napkin and was reading when his regular waiter brought a chef's salad, his standing order. Mr. Shaner looked up to flash his warm smile, then returned to his newspaper and his first love: His insatiable interest in men and their affairs. Shortly thereafter he suffered a fatal heart attack and died en route to the hospital.

This thumbnail sketch of the last morning in the life of Earl Shaner is typical of the man. He was a leader who did not seek the limelight. His strength did not arise from an outward show of power. Rather, it came from a rare gift that is best typified as the human touch. Penton employees knew him as a kindly man who had the warmth of personality that made them feel he was their friend and protector. To readers of STEEL and the thousands of metalworking men he talked to in the field and from speakers' platforms, he was a man of great wisdom and understanding. Wherever STEEL editors traveled, the first question always was: "Well, how is my old friend, Earl Shaner?" He was the kind of man people like to know.

Mr. Shaner joined the Penton Publishing Co. in 1916 as an editor of Iron Trade Review (now STEEL). After serving as an officer in World War I, he returned as engineering editor of Iron Trade Review. He rose rapidly. After holding posts of managing editor and editor, he was made editor-in-chief in 1937. A director of the Company since 1925, he was president and treasurer from 1937 to 1949. Since then, he served as chairman.

He was a member of the U. S. Reparations Commission which inspected industrial plants throughout the world in 1946. His society memberships included the American Iron & Steel Institute, American Society of Mechanical Engineers and Cleveland Engineering Society.

Born June 11, 1890, in Olean, N. Y., he was graduated from Purdue University in 1914 with a B.S. degree in mechanical engineering

Mr. Shaner's final editorial, written two hours before his death, appears on following page

Needed: Facts About Jobs

In its new pamphlet "Steadier Jobs," the U. S. Chamber of Commerce urges management to take a more active part in stabilizing employment. It points out that leveling peaks and valleys of employment would reduce labor turnover, cut the cost of training, make for better utilization of equipment and lower unemployment compensation costs appreciably.

Greater regularity of employment also would serve another purpose. It would help to focus attention upon just what constitutes real, unpreventable unemployment. In doing so, it would reduce the abuses that arise when unemployment becomes a political football.

In the Nov. 2 elections, unemployment had a lesser effect than many persons expected. Nevertheless, its impact was easily discernible in returns in Michigan, Kentucky, West Virginia and elsewhere. It might not be too hard to prove that if management had made stronger efforts to stabilize employment in certain industries and localities, election results in some areas might have been quite different from what they were.

If management were to make a serious attempt to regularize employment, one of the first steps ought to be to investigate and report to the public the honest, exact status of job holding today. One hears much about the people without jobs and about people who are working only a few days a week. The public knows practically nothing about the hundreds of thousands who still are working more than 50 hours a week. Nor does the public hear much about the considerable number of men and women who regularly hold down two or more jobs.

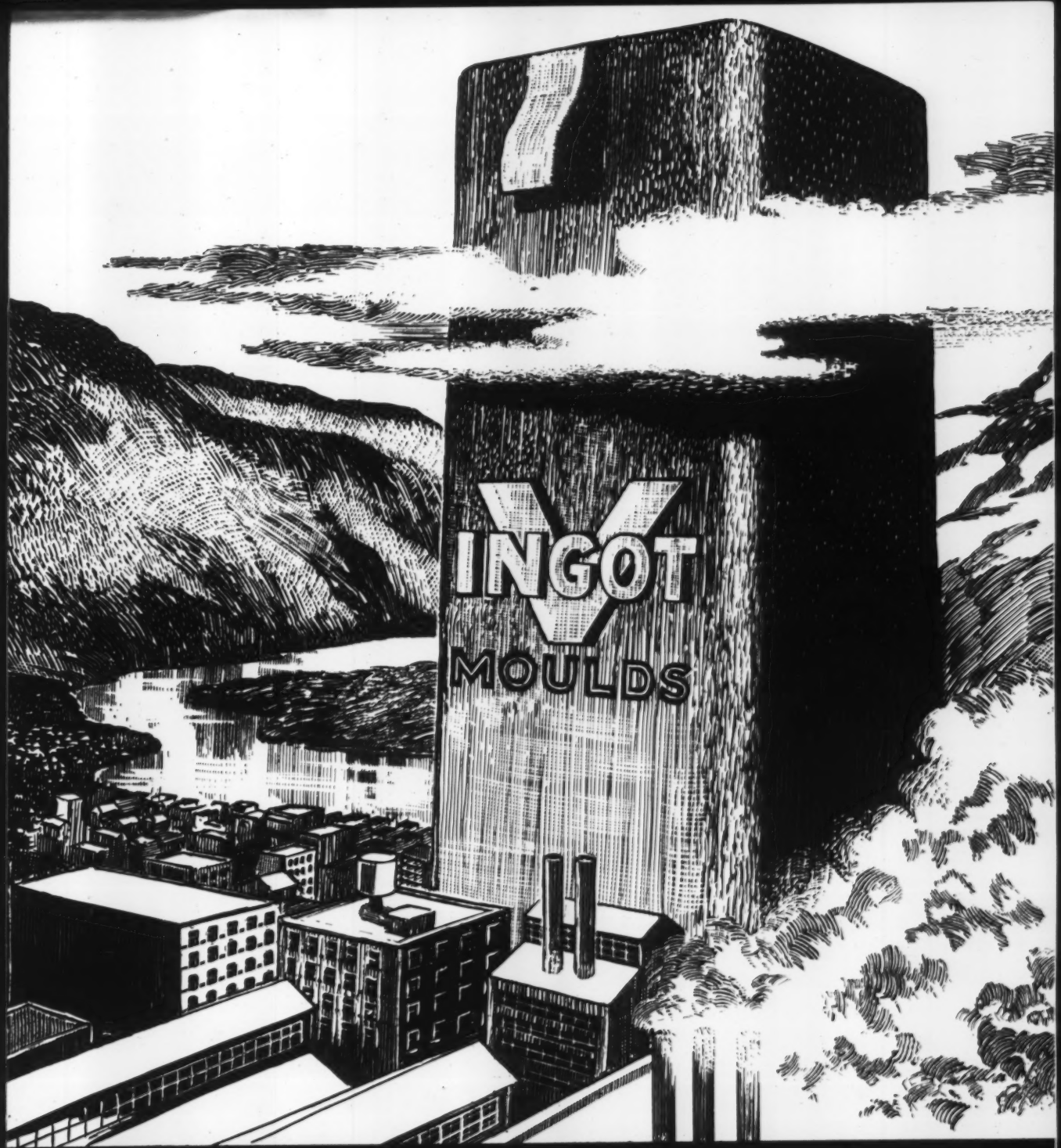
To those conditions may be added circumstances where three of the four members of Family A on one side of the street hold down good jobs while only one of the four members of Family B on the other side of the street is employed. Also it is pertinent to know to what extent unemployment or low employment is by choice and to what extent by necessity.

It may be found that we have more job opportunities than is generally realized but that they are distributed more unevenly than is usual or desirable.

We need to know more about jobs and who holds them.

E. L. Shaner

EDITOR-IN-CHIEF



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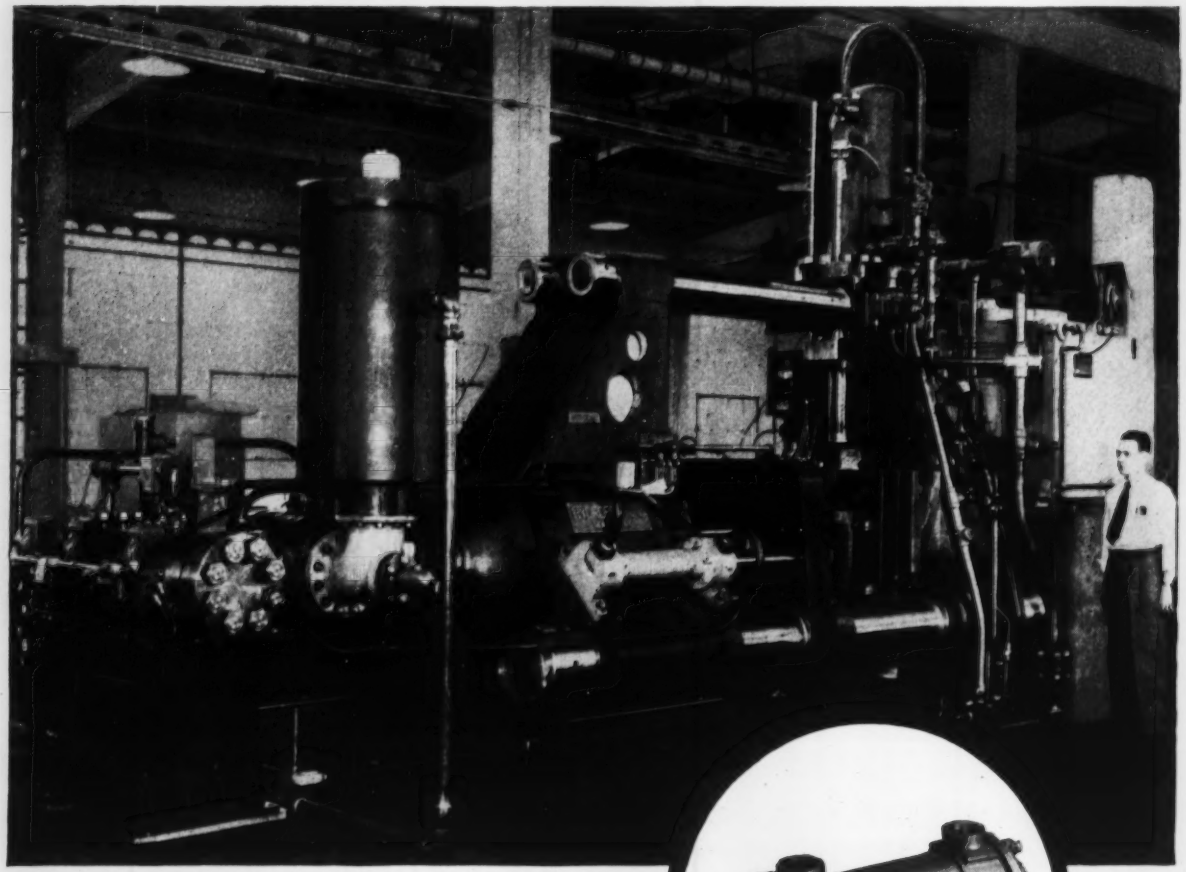

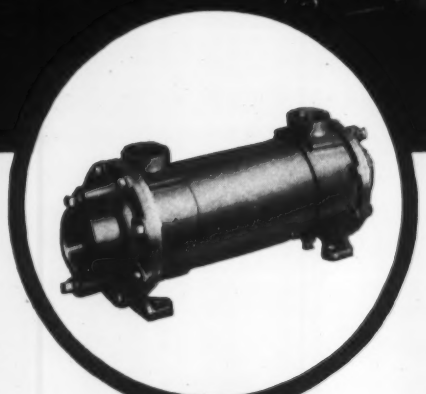

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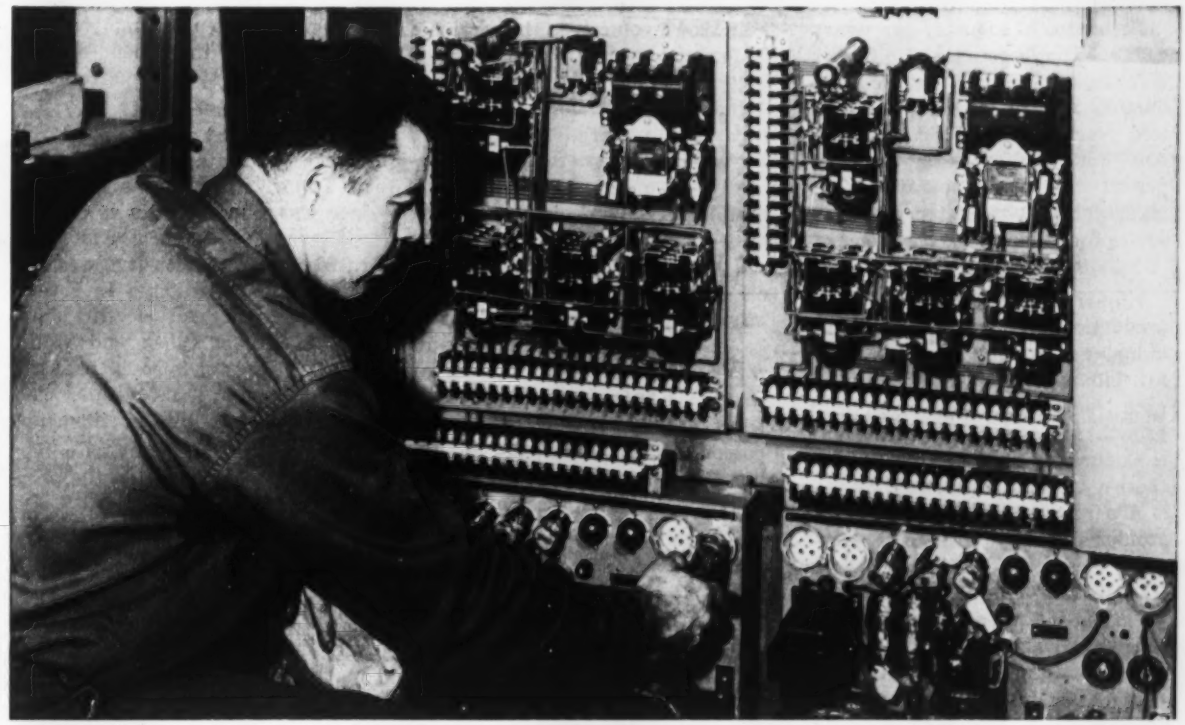


Electronics: Growth Industry of the Decade

MAGNECORD INC., Chicago, maker of magnetic tape equipment, buys Davies Laboratories Inc., Riverdale, Md., radio and electronic firm.

Perkin-Elmer Corp., Norwalk, Conn., maker of scientific instruments, creates a division to produce a transformer for servo systems and analog computers.

Radiophone Co., subsidiary of Northrop Aircraft Inc., expands in Monrovia, Calif., to produce more electronic tubes.

Ramo-Wooldrige Corp., Los Angeles, formed only 14 months ago to do research and to manufacture electronic systems, expects sales of $10 million in the next 12 months.

The four developments are typical of hundreds going on in electronics. Companies in other fields are getting into electronics by buying companies or setting up new divisions. Established companies are expanding. New firms are being formed.

Explanation—What's the explanation? There are four answers, believes Dr. A. M. Zarem, manager of Stanford Research Institute's Los Angeles division: 1. Military demand for electronic controls (guided missiles, aircraft and atomic work) has boosted the industry enormously and will account this year for $4 billion or more in sales. 2. America's craving for home entertainment (radios, high-fidelity sound reproduction and television) will mean another $2 billion in business in 1954. 3. Industrial needs for automation, paperwork processing and computing will this year bring $1.8 billion in added volume. 4. It doesn't take too much money to get into the business. Working capital and capital investment requirements are relatively low.

So impressed with the potentials of electronics is the Los Angeles Chamber of Commerce that it has just made an area survey of the industry. In that locality, it estimates, sales will jump 52 per cent

ELECTRONICS SALES SOAR

1947	$1.5 billion
1953	$7 billion
1954	$8 billion
1960	$12 billion

All figures estimated by STEEL

by 1960. As the chart shows, national growth will be about 50 per cent the next five years.

Estimates of industry sales vary widely. That's because of differing definitions of electronics. But production will hit about $8 billion this year if it is defined this way: Any kind of apparatus—or component for that apparatus—that uses a tube, transistor or other device for utilizing electrical energy in minute amounts.

Higher and Higher—Still higher production peaks are coming. Some industry men think sales will reach $12 billion by 1960 and will climb even more in the 1960s. That growth alone would attract many a company into electronics, but there's another attraction.

A survey of 14 West Coast electronics firms by William R. Hewlett, vice president of Hewlett-Packard Co., Palo Alto, Calif., and president of Institute of Radio Engineers, shows: Capital equipment investment averaged 9 per cent of annual sales, compared to a 70 per cent ratio figured for industry generally by the Machinery & Allied Products Institute. The working capital investment per employee of the 14 firms averaged $2500, compared to $4000 for industry generally.

Unfavorable Tides—While those factors are all favorable for entrance into electronic waters, there are undertow possibilities, too. Management manpower is in short supply. Needed are the men and women who can keep a company afloat in the swiftly changing technological currents. Also required are uncommonly skilled production workers. Los Angeles firms alone hire some 61,000.

And there's already plenty of competition for business, expanding though it is. Estimates put 5175 companies doing some kind of electronic manufacturing. The accompanying list shows how they are concentrated nationally.

Although capital investment can be relatively low, you do need money. In Los Angeles county alone, new capital investment in plant expansions and new manufacturing facilities during 1953 totaled $26.5 million.

Civilian Turn—Yet another problem for electronics manufacturers is the current dominance of military business on most order books. The government will account for half 1954's volume, so the scramble is for commercial products and a better sales balance.

Indications are that they're coming. Radio Corp. of America's David Sarnoff says RCA will eventually have an all-electronic air conditioner. Work is progressing on electronic x-ray equipment to sell at half to one-tenth the cost of present apparatus. Raytheon Mfg. Co. already has on the market a device that cooks by radio waves. Kay-Lab Inc., San Diego, offers a new communications system—you can talk to and see a person at the other end of the line. Commercial uses for radiation instruments are increasing yearly (p. 96).

Joseph J. Peterson, western manager of Radio-Electronics-Television Manufacturers Association, is one of the many men connected with the industry who believes that the greatest potentials for commercial electronics are in industry. He thinks that the coming simplification of electronics equipment will greatly widen application.

The Baby—Industrial electronics is the smallest segment of the industry today, but the infant promises to grow the fastest. Volume can easily double to $3.5 billion by 1960. Its continued growth in the 1960s is expected to be even greater than military and home entertainment uses.

Electronics is already the growth industry of this decade. It may be for the next one, too.

WHERE ELECTRONICS MANUFACTURERS ARE

	firms
New England	800
Metropolitan New York	800
Chicago	600
Philadelphia	600
Northwest States	300
Southwest States	300
Southeast States	200
Los Angeles	575
Other	1000
Total	5175

GE Expands Product Market

General Electric Co. will make its pure tungsten and molybdenum products for the open market. Previously, they were offered to only a limited extent.

The company's Cleveland Wire Works, with its subsidiary plant at Dover, O., produces and markets these pure metals as powder, rod, wire, rolled sheet and fabricated products. Both tungsten and molybdenum find uses in several forms as parts for electric lamps and electronic tubes and equipment. Tungsten also is used for carbide cutting tools, welding electrodes and metallizing filaments.

GE is building a $1.7-million laboratory-pilot plant on the property of the Cleveland Wire Works to further efforts to develop new tungsten and molybdenum products and improve existing ones. The structure is expected to be completed next summer.

To implement the plant's new sales policy, John W. Forbes, formerly assistant manager of Cleveland Tungsten Inc., has been placed in charge of all marketing operations involving GE's tungsten and molybdenum products.

Private Radio Rule Eased

Manufacturers with plants in metropolitan areas of more than 500,000 population now can communicate by radio with mobile units outside their yard areas.

The same Federal Communications Commission order reduces from five to four the number of frequencies available for manufacturers. Interested groups are expected to protest the reduction and seek clarification of limitations on the outside use revision.

New Headlight On

A new sealed-beam headlight is announced by Auto Manufacturers' Association. It provides better distribution of light on the roadway, a sharp reduction in stray light radiating upward from the lower beam filament and higher wattage on both beam patterns.

The result of a four-year cooperative engineering effort by U. S. motor vehicle and headlamp

manufacturers working closely with public officials, the new headlamp design is now ready for production. It is completely interchangeable with sealed beam lamps presently in use and will be adopted as standard equipment by automobile manufacturers in the U. S. and Canada for the 1955 models.

Mt. Shasta Develops Plans

Mt. Shasta Steel & Tube Co. will establish a steel mill and smelting plant in Shasta county, Calif., reveals company Secretary Fontaine Johnson. Details, he says, will have to wait for at least another month.

G. I. Dumond is president of the company. He was behind Yolo Steel & Metals Co., Sacramento, Calif. That company obtained several certificates of necessity for a $136.5 million integrated steel plant in Yolo county, Calif., but later gave it up as a "busted dream."

However, with the dropping of the plan, he announced his organization would go into mining. It obtained leases on several thousand acres of ranch land near Shasta Lake.

Mr. Johnson reports that testing showed 34 per cent iron and that only 27 per cent was needed to make the project economically feasible.

Work Stoppages Decline

Strike activity, in terms of stoppages and workers involved, was lower in the first nine months of 1954 than in any corresponding period since World War II. The preliminary estimate is made by the Labor department's Bureau of Labor Statistics.

In the January-September, 1954, period, 2875 work stoppages idled 1,290,000 workers for 18 million man-hours. During the same period last year, 4437 stoppages idled 2,080,000 workers for 23 million man-hours.

New stoppages in September of this year were estimated at 350 by the bureau—the same as in August. A total of 280,000 workers were involved in stoppages during September, compared with 300,000 in the preceding month.

For a Good Financial Report . . .

- **Make reports attractive, but remember pictures aren't a substitute for facts**
- **Keep your style simple, but don't "talk down" to stockholders**
- **Be sure your information is comparable to industry practice**
- **Compare your company's operations with similar enterprises**
- **Include a full discussion of business conditions—good and bad—having a direct bearing on company sales and operations**
- **Discuss your long-range objectives and management philosophy even though you're reluctant to make forecasts**

FINANCIAL reports should be read and understood.

Some recent attempts to simplify them are more of an insult than a help to stockholders, says M. Dutton Moorehouse, president of National Federation of Financial Analysts Society. At the American Management Association's New York financial conference, he gave these suggestions:

Divided Interest—Conflict of interest between the typical stockholder and financial analyst can be satisfied, he states, by including a brief president's message containing all the salient information. Follow it with a detailed discussion for the large stockholder and analyst. Mr. Moorehouse commended the growing practice of preparing detailed supplemental financial information which can be obtained on request.

Sales breakdowns, he says, are helpful in understanding the nature of the company's business, but they may also be misleading, since earnings and sales are not necessarily synonymous. If earnings breakdowns are competitively undesirable, the stockholder should be warned when sales breakdowns presented are likely to be misleading.

What's Secret?—Regarding the omission of information, Mr. Moorehouse advised management to find out if competition already has the facts. Company sales are being made available in the 10-K report to the Securities & Exchange Commission; a competitor also can find such information in Moody's Industrial Manual.

Other topics which he urged be covered in annual reports include: Company financial policies regarding dividends, capital requirements and retained earnings, discussion of sales backlogs, government business and pricing problems.

Two Ship Conversion Awards

Bethlehem Steel Co., Baltimore, and Ira S. Bushey & Sons Inc., Brooklyn, N. Y., will convert and reactivate two Liberty ships. The work will be under two contracts (totaling $4,149,000) to be awarded by the Commerce department, Louis S. Rothschild, maritime administrator, announces.

The awards are a part of the Maritime Administration's Liberty Ship Experimental Conversion Program, which was authorized by the 83rd Congress to upgrade and improve the Liberty type cargo vessel. The government owns 1400 of them.

Contracts call for the installation of a steam turbine and improvement of cargo handling gear of the *SS Benjamin Chew* by Ira S. Bushey & Sons Inc. ($1,079,000); and the installation of a geared diesel drive, a new system of cargo handling cranes and lengthening by 25 feet of the *SS Thomas Nelson* by Bethlehem Steel Co. ($3,070,000).

Cessna Aircraft Corp

Private Planes: Magic Carpets for Busy Bosses

A REPUBLIC STEEL vice president delivers a luncheon talk in New York, a dinner speech in Washington and returns to Cleveland that night. Koppers Co. invites Pittsburgh newsmen to view the company's equipment in a plant 400 miles away. All return the same day.

Sound impossible? Well, it isn't today. Businessmen are adding a new dimension to their activities with private airplanes.

Size and Stature—Civil Aeronautics Administration statistics show that 11,100 company-owned aircraft were engaged in business flying in 1952; another 19,400 individually-owned planes went on business trips that year.

Business transportation accounted for 420 million plane miles in 1952, says CAA. That's 9 million plane miles more than the 15 domestic trunk lines flew. Record business flying time of 3.1 million hours in 1952 far exceeds the 2.6 million hours logged in 1949, the 1.1 million hours in 1946 and the prewar peak of 314,000 hours in 1940.

Metalworking's in Step — A growing number of metalworking industries are adding to this trend in 1954. Aluminum Co. of America's two planes will fly 160,000 plane miles this year. With an expected average of more than 3 passengers per plane mile, Alcoa will fly some 500,000 passenger miles in 1954—substantially more than the company anticipated when it bought its first plane less than three years ago.

Real Advantages—While costs per passenger mile are on a competitive footing with commercial travel accommodations (see box), costs are only half the story.

"Use of an executive plane is fundamentally transportation, but it is a service which can be tailored to fit specific needs of the company," explains Joseph T. Geuting Jr., Aircraft Industries Association, Washington. ". . . its real value results from freeing an executive's time or making it possible for an executive to undertake assignments which would otherwise be impractical or impossible."

What happens when the vice president-operations and the vice president-sales ask for the company airplane on the same day? One solution to which more companies are turning is a second

OPERATING EXPENSES

Cost per mile decreases as total use increases. Fuel and maintenance costs are constant, but pilot, depreciation and insurance costs per hour decrease with greater usage of the aircraft.

Beech Aircraft Corp. estimates the hourly operating cost of its D18S model is $79.43 if flown 600 hours per year; $54.61 if flown 1200 hours a year. At $54.61 per hour, total cost per seat-mile is 5.6 cents.

Here's the estimated cost breakdown on the $54.61 hourly cost:

Fuel & Oil	$15.09
Pilot (based on a monthly salary of $700)	9.50
Depreciation	12.00
Indoor Storage and Maintenance	13.06
Insurance	4.96
	$54.61

plane. "Use of a lower-cost second airplane makes possible twin-engine transportation for a wider echelon of company officials," says Piper Aircraft.

All in the Family — Republic Steel Corp. works up flight plans to make its aircraft serve the greatest number of people with the least cost. It's a company policy to carry as many people as possible on each flight. Before each trip, flight planners check with the traffic department to find who has requested public transportation. If a Republic plane is going in the same direction at that time those people are notified. They are scheduled on the plane if they desire.

That's one more proof that a smooth-functioning aerial service can really add a new dimension to American industry—the business plane.

Railroads Win ODM Grants

Railroads dominated the list of certificates of necessity issued by the Office of Defense Mobilization Oct. 7 to 20.

Thirteen rapid-tax amortization certificates totaling more than $8 million were issued for railroad freight cars, passenger cars, diesel engines and yard and track facilities.

Included in the list of 33 certificates granted by ODM was one for $1.9 million to Bethlehem Steel Co., Sparrows Point, Md., for steel plate facilities.

Investment Casters Meet

The Investment Castings Institute is seeking to get broader coverage of castings types by the Society of Automotive Engineers.

Action taken at ICI's second annual meeting in Chicago last week included plans to submit additional specifications to the Air Material Specifications Committee of the SAE after a study by producers and users.

About 80 attended the two-day session. Ted Operhall, Misco Precision Casting Co., Whitehall, Mich., was elected president. Re-elected vice president was V. S. Lazzara, Casting Engineers Inc., Chicago.

PUMPS . . . NEW ORDERS	
1955	$66,800,000*
1954	$59,500,000*
1953	$68,245,000
1952	$71,630,000
1951	$80,175,000
1950	$53,400,000

Source: Hydraulic Institute
*Estimated by STEEL.

Pumps: Business Gets a Boost

PUMPMAKERS are getting set to do a little priming of their own. Most of them expect their business will pick up next year to somewhere between 1953 and 1954 levels. So they're rebuilding inventories, planning more automation and getting ready for their share of the increased business.

The outlook for higher pump sales is added evidence that the whole economy is strengthening. Pumps are universal. They are used in everything from the power steering unit on a new car to huge irrigation projects. A pickup in pump ordering signals increasing activity in chemicals, petroleum, farm and construction equipment, aircraft and machine tools. It also bodes well for plant expenditures, which include pumping facilities for water and other liquids used in manufacturing.

Going Up — Air conditioning seems due for an upturn, too, on the basis of a report from Tuthill Pump Co., Chicago, whose pumps find their main use in that industry. President H. T. Kessler says his company's business should show a 10 to 15 per cent year-to-year gain over at least the next couple of years.

J. W. Tomka, manager of hydraulic equipment sales for American Steel Foundries' Elmes Engineering Division, Cincinnati, says demand for its special reciprocating plunger type pumps has been steady over the last few years. These pumps go into accumulator systems and high pressure hydraulic presses. Outlook is for business at its present level, which indicates that Elmes' customers in the plastics, rubber, molding and steel industries are keeping up expenditures.

Kinney Division of New York Air Brake Co. has a new series of high vacuum pumps for the expanding vacuum metals field.

Competition Plus — Over 400 firms in the country make pumps, which means competition is stiff.

So pumpmakers are continually trying to make their products more competitive. The attack takes two directions, says W. A. Finn, assistant general sales manager, Worthington Corp., Harrison, N. J. In this industry, you've got to make a better product at the same cost or you've got to offer the same product at a lower cost. Otherwise competition will get ahead of you.

Good Supply—In general, most pumps are in good supply. Special items, of course, are built to order and delivery time depends on the pump itself.

Unlike the case in some other lines of business, foreign competition hasn't bothered the pump industry much. But firms who export, meeting foreign companies on their own base, report that competition is increasing markedly.

New Cars: A 'Scrabble' for New Adjectives

Buick's Century, Super Riviera and Roadmaster

Plymouth's Belvedere four-door sedan

Ford's Fairlane Crown Victoria

POWER, PLUSH and paint highlight new car models introduced last week. They were accompanied by some of the most fantastic adman jargon to hit the industry.

Examples: Widescreen grill—Buick; flite-control gear selector—Plymouth; trigger torque power—Ford. Bop-like language to the contrary, the autos display some worthwhile improvements, a few of which follow:

Buick — Features include rear panel and trim changes; "variable pitch" Dynaflow in which turbine blades vary hydraulically for performance or cruise positions; and horsepower jumps to 236 in Roadmaster, Super and Century series.

Chrysler — New bodies with sweptback windshield; new V-8 engine in the Windsor line; new suspension; and horsepower hikes to 250 on New Yorkers and Imperials are highlighted. Crown Imperial eight-passenger sedans are more than 20 feet long.

Dodge — Horsepowers range from 123 in the six-cylinder model to 193 in the Super Red Ram. In between is the new Red Ram engine at 175, sans hemispherical head. New bodies, three-tone paint and new suspension complete the list.

Plymouth—With horsepower up to 167 in the new V-8 engine, new bodies and new everything else, including a dash-mounted automatic transmission selector lever, the car is back into the fray with a bang.

Ford—New Fairlane series and the 198-hp Thunderbird keynote Ford offerings. Conventional cars offer up to 182 hp, new suspension and wrap-around windshields; new Crown Victoria is under 5 ft. in overall height.

Lincoln—With no wrap-around windshield, the Lincoln is further distinguished by push-button lubrication, new rear panels, new grill. A new transmission, plus a horsepower hike to 225, coupled with a torque of 332 foot-pounds at 2500 rpm complete the list.

Titanium Research Pushed

Defense department interest in titanium is signaled by a new research and development contract for the production of titanium chloride from domestic ores.

The General Services Administration has been instructed to arrange the contract with Bureau of Mines facilities at Boulder City, Nev., and Albany, Oreg. This will mean the reopening of the Boulder City facility, which has been shut down since the end of September.

Stockpiling Progress Told

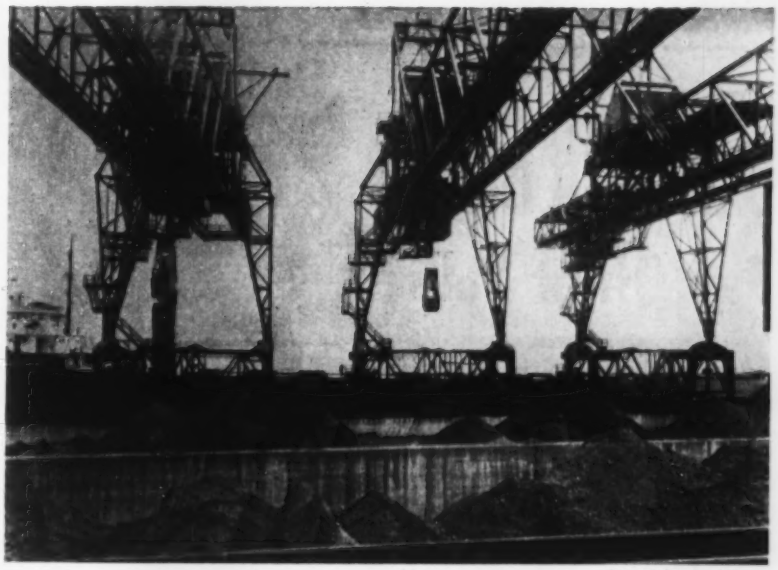
Government purchases of strategic and critical materials through Sept. 30, 1954, are announced by Edmund F. Mansure, administrator of general services. Deliveries to date and the percentage of quantity authorized are:

Tungsten—1,224,367 short ton units (20 lb each), 41 per cent; manganese—9,412,988 long ton units (22.4 lb each), 25 per cent; chrome—70,040 gross tons, 35 per cent; mica—4,157 net tons, 17 per cent; beryl—457 net tons, 30 per cent; asbestos—617 net tons, 41 per cent; columbium-tantalum — 5,326,144 lb (foreign and domestic deliveries combined), 36 per cent; mercury—of 125,000 flasks (76 lb) authorized, none has been delivered.

1955 Defense Metal Levels

Defense allotments of steel, copper and aluminum for producers and prime contractors of special military equipment for the first quarter of 1955 have been made.

Office of Defense Mobilization says that steel allotments of 651,270 net tons are 8 per cent lower than those of the last quarter of 1954; copper allotments of more than 70 million lb are 2 per cent lower; and aluminum allotments of more than 117 million lb are 10 per cent higher. The government points out that the changes from 1954 to 1955 do not reflect increased or decreased programs. They are the result of inventory levels, changes in materials specification and model revisions.



Great Lakes Steel Corp.

Long Planning Heads Off Ore Shortage

ALTHOUGH Lake Superior high-grade direct-shipping iron ore is running low, Felix E. Wormser, assistant secretary for mineral resources, sees small ground for gloom since "industry has faced and is overcoming the problem."

By 1960, forecasts Mr. Wormser, iron ore needs will grow to 150 million tons annually—an increase of 10 million tons over present average requirements. The Lake Superior area produces about 81 per cent of domestic ore. Although it can yield about 100 million tons annually over the next several years, he feels that it will be with increasing difficulty. Mr. Wormser estimates that in high consumption years as much as 40 to 50 million tons annually may be needed from other sources.

Check—Industry recognized the inevitable as long ago as 1935, when engineers were sent overseas to prospect for likely ore deposits. Results are that Liberia supplied 1 million tons of top grade ore in 1953; the Cerro Bolivar and El Pao deposits, together, shipped more than 2 million tons in the first six months of 1954; and the Ungava fields in northern Quebec and Labrador may deliver up to 40 or 50 million tons each year when the St. Lawrence seaway is completed. By 1975, it is estimated that we will be able to import about 35 per cent of our total annual needs.

Mate—Industry also plans to spend $500 million (STEEL, Sept. 13, p. 76) on plants to refine taconite. By 1975, as much as 30 million tons may be produced annually from substantial deposits in the Lake Superior region. Ultimate capacity is projected at 43 million.

Mr. Wormser thinks the most significant aspect of the long range program is that the monumental difficulties are being tackled entirely by private capital and initiative.

Nonferrous Ore Body Found

American Metal Co. Ltd., a New York company, has discovered a high-grade lead-zinc-copper ore body on its Little River mining claims 32 miles north of Newcastle, N. B., Canada.

Four months of drilling disclosed about 4 million tons of ore that also contains gold and silver. A gross value of nearly $150 billion is placed on three of the ore bodies—about one-seventh of the prospective zones indicated by airborne geophysical prospecting.

By E. C. KREUTZBERG Washington Editor

Did Union Dollars Pay Off at Polls?

Influence this year is debatable; real test of labor strength may come in the 1956 campaign

SOME CLAIM this year's elections were a substantial labor victory. Others haul out off-year election records to show that the results matched a pattern.

But one factor can't be denied: The unions were in there pitching for "friendly" candidates. They tossed over $800,000 into the federal, state and local campaigns (see table). And when you match pre-election endorsements with successful campaigners, the results are impressive.

The Strategy—Using the rifle rather than the shotgun technique, the unions concentrated on those states and congressional districts where the margin of victory and defeat was slight in 1953 and where a little extra push might insure success this year.

Over $162,000 contributed by the Big Five labor organizations went to campaign funds of 84 candidates for the Senate and House. A check shows that 45 of them won seats, 37 lost. Two died before the elections.

Endorsement Only—The Big Five also endorsed a number of candidates who did not receive union campaign money. The CIO says 15 of the 24 senatorial candidates it endorsed were elected and 128 of the 256 House campaigners were successful. The AFL claims 18 of 30 endorsed in the Senate and 152 of 282 endorsed in the House.

The results can hardly be called a smashing labor victory. But the campaign indicated what efforts can be expected from the unions in future elections. Says AFL President George Meany: "Especially in the big industrial areas, candidates supported by the AFL won overwhelming support at the polls. While we still lack majorities in Congress that will consistently support the legislative objectives of labor, the election results are likely to swing congressional action toward a more liberal course in the main."

Goal Ahead—Big Labor has already pledged an all-out campaign to elect a "thoroughly liberal Congress" and administration in 1956. Unionists claiming a substantial victory in the 1954 elections point out, too, that the campaign also served as a boost to the AFL-CIO merger talk. With the nation's union membership totaling over 17 million, it's conceivable that the superunion combination could control over 30 million votes in an election.

If the nation's economy maintains its current pace for the next two years, the 1956 elections may provide the real test of union strength at the polls.

Labor: A Bigger Stake in Politics

TOTAL REPORTED SPENDING

(Jan. 1 to Sept. 10, 1954)

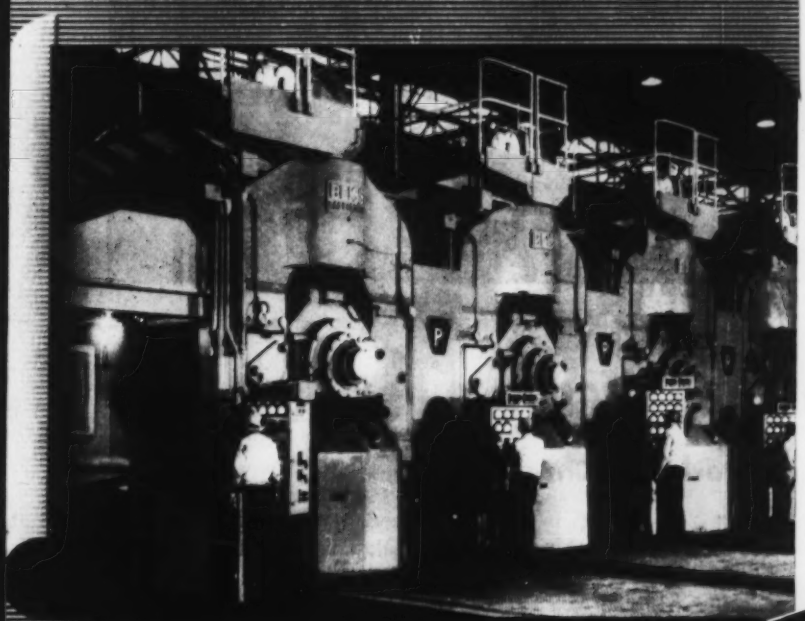
POLITICAL ACTION GROUP	STATE, LOCAL EDUCATION FUND	FEDERAL ELECTION SPENDING
Political Action Committee (CIO)	$222,511.20	$178,594.36
Labor's League for Political Education (AFL)	———	287,038.94
Nonpartisan Political League (Machinists—AFL)	21,902.80	16,965.37
Railway Labor's Political League	437.50	59,003.06
Political Education Fund (Textile Workers—CIO)	1,785.00	37,311.04
TOTALS	$246,636.50	$578,912.77

(Figures include campaign contributions and expenses incurred in political activities. Expenditures from education funds are limited to state and local races. National campaign contributions are listed under Federal Election Spending.)

More Plums for Small Firms

In its first 14 months of operation, the Small Business Administration set aside more than $300 million in military purchases for exclusive award to small business.

Wendell B. Barnes, SBA administrator, says: "Although actual awarding of contracts under the joint determinations program of SBA and the Defense department necessarily lags behind decisions to restrict certain military purchases to small business, small firms have already received more than 2000 contracts totaling about $145 million."

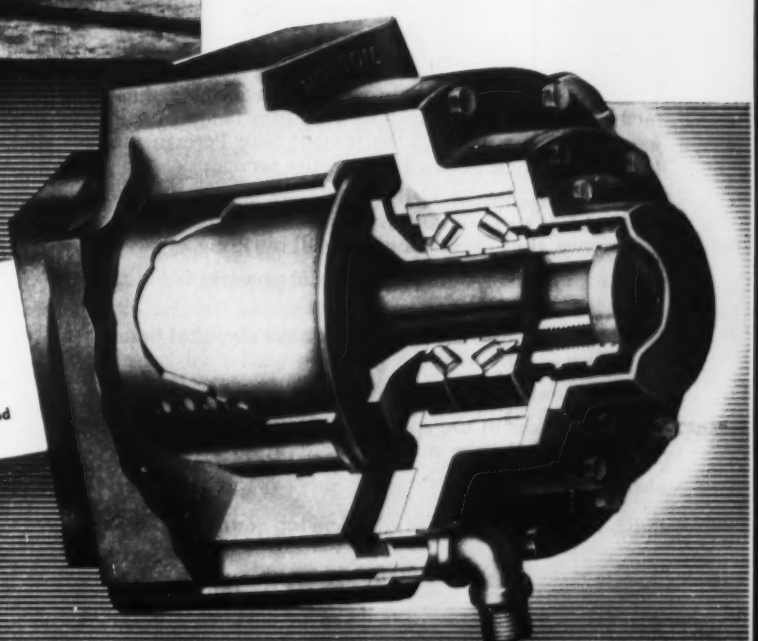


Hot Mills or Cold Mills **MORGOILS** give Top Performance

In the modern Allenport plant of Pittsburgh Steel Co. both the Hot Mills and Cold Mills roll on MORGOIL BEARINGS.

Whatever the rolling requirements MORGOIL equipped mills excel in performance and low maintenance costs.

MB-28



MORGAN CONSTRUCTION CO.
WORCESTER, MASSACHUSETTS

Rolling Mills - Morgoil Bearings - Wire Mills
Regenerative Furnace Control - Ejectors - Gas Producers

English Rep., International Construction Co., 56 Kingsway, London W. C. 2, England

Get longer end wall life at lower cost

with Permanente Periclase-Chrome A Brick

THE SPECIAL COMPOSITION of Permanente Periclase-Chrome A Brick has greatly increased end wall life in open hearth furnaces of leading steel producers—*often with thinner walls at lower cost!*

This composition reduces spalling to an absolute minimum—even under severe attack by iron oxide in exit gases. Here are some of the reasons why Permanente Periclase-Chrome A Brick gives better service:

1. **Chromite content is the minimum amount (only 9.1% Cr_2O_3) necessary to provide thermal shock resistance, thus preventing end wall buckling.**
2. **Brick does not go through a liquid phase in forming its ceramic bond.**
3. **A ceramic bond is formed *before* the chemical bond is destroyed.**
4. **MgO content is higher than in other end wall brick.**
5. **In addition to the special composition, the brick's maximum density minimizes alteration by resisting gases and impurities.**

Let your Kaiser Chemical sales engineer show you how you can get longer life from your end walls with Permanente Periclase-Chrome A Brick. Wall thickness may often be greatly reduced with this superior brick, or *end wall life may be extended,* depending on the needs of your operation.

Call or write any of the sales offices listed below for immediate attention to your particular problem.

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, California . . . First National Tower,* AKRON *8, Ohio . . . 518 Calumet Bldg., 5231 Hohman Avenue, Hammond, Indiana* (CHICAGO).

Kaiser Chemicals

Pioneers in Modern Basic Refractories

Basic Refractory Bricks and Ramming Materials • Dolomite • Magnesia • Magnesite • Alumina • Periclase

Management at Work

WEMCO's Ralph Utt: Teamwork Pays Off

"TEAMWORK can give your company the equivalent of an Edison or a Carnegie even though not a man in your organization can match their abilities."

That's the management philosophy of Ralph B. Utt, vice president of Western Machinery Co., San Francisco, and general manager of its manufacturing arm, WEMCO Division. WEMCO engineers, produces and sells equipment for mineral processing, coal preparation and aggregate treatment. Other Western Machinery divisions engage in construction, engineering and sales work for the mining and construction industries.

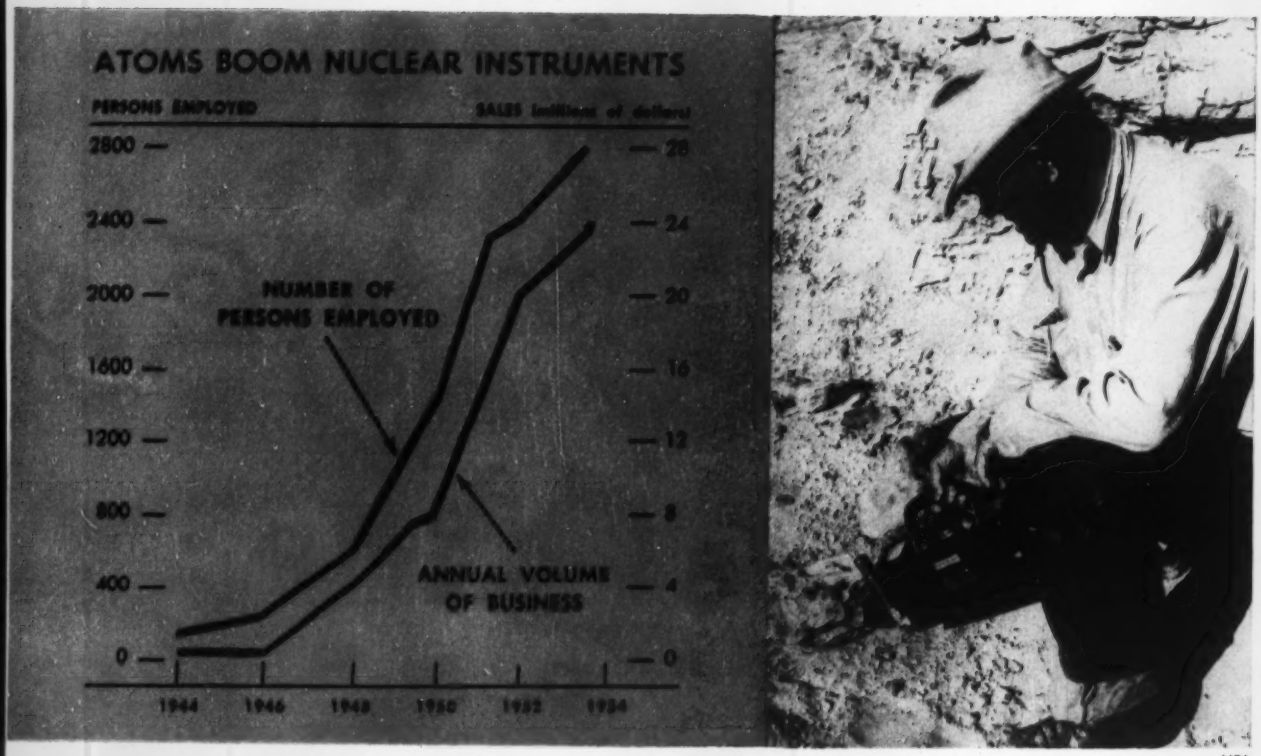
The Basis—To achieve teamwork, Mr. Utt seeks capable men who are co-operative. After that's accomplished, "individual recognition is everything." One way he recognizes the individual is to see that men who do product development on an idea get the patents. As chairman of the company's development committee, he believes his chief role is to offer ideas, letting others do the job of making them work.

And he places great emphasis on good products to achieve teamwork. "If you don't have something to make and sell that your men can be honestly proud of, you'll get nowhere," he believes. To get this kind of product, WEMCO has a mechanical engineering staff more than seven times larger than it was in 1941 when Mr. Utt joined the company. Current sales for the division are at a rate of $4 million annually. WEMCO equipment is in use all over the free world for mining and processing of iron ore, base metals, coal and nonmetallics. Sales of its apparatus for taconite processing and uranium mining are particularly active.

Biography—Although only 46, Ralph Utt is a veteran of 33 years in the mining and equipment industries. He went to work in a mine at the age of 13. But he managed to get an education, too, including an engineering course at the University of Idaho from which he was graduated in 1934. He was the most experienced man in his class since he had already been a mining superintendent.

During the depression there wasn't too much for a mining superintendent to superintend, so he decided he couldn't do any worse financially (and could broaden his experience at the same time) by selling mining equipment. At first he thought he would eventually get back to mining, but he has stayed in the equipment phase of the business.

Western Machinery's H. N. How, chairman of the board, says, "I think he'll stay in this end of mining. I hope so. He's a good team man."



NEA

Atoms Activate Instrument Industry

Nuclear research and development have mushroomed the radiation instrument industry. The 1954 Atomic Energy Act revisions should step up private industry's expansion in other phases, too

JUST THREE small companies made nuclear instruments in 1943. They produced only six different types.

Today, 96 companies compete for a radiation instrument market of nearly $30 million, and prospects are good: The sales potential for the next five years is $198 million.

Impetus—The sales accelerator is the revised Atomic Energy Act which permits and encourages more participation by private industry in nuclear development. Here's a market appraisal outlined by Robert L. Butenhoff, chief of the radiation instruments branch of the Atomic Energy Commission.

The government is still the radiation instrument industry's best customer. The AEC will spend about $6 million on instruments this year, defense and other agencies about $9.5 million.

Lion's Share—The AEC has an inventory of at least $13 million, Mr. Butenhoff points out, and the depreciation and turnover rate of instruments runs about 25 per cent annually. Another major factor in the market outlook is the growing demand for instruments permitting automatic control of operations. AEC's estimated needs for the next five years—$45 million worth of instruments.

Defense department expenditures hit their peak in 1952 when appropriations included instrument research and development. Bulk of the money will go for procurement—an estimated $35 million between now and 1960.

The Home Front — Until now civil defense has been a minor market, but in the light of high contamination possibilities of new weapons, officials are reviewing instrument requirements. In the next 5 years an estimated 50,000 survey meters and 1.5 million dosimeters will be required—a possible $30-million market.

Other governmental agencies like the National Institute of Health, Bureau of Standards, FBI, Customs and Food and Drug are increasing their uses of radiation instruments. Estimated 5-year market—$5 million.

Watching Isotopes—Use of radioisotopes and nuclear instruments go hand in hand. Industry's increasing use of radioisotopes in research and nondestructive testing is creating a new demand for instruments. Isotope uses in the

medical field, too, are increasing. Outlook for the market—$55 million.

In the mining industry, prospectors purchased an estimated 30,000 geiger counters this year. In addition, there's a growing preference for scintillation counters for prospecting and new aerial detection equipment. Drill hole logging, too, is gaining popularity, and AEC officials estimate there's a potential $15-million market ahead in the mining industry.

Plus These—An anticipated $5 million in instrument sales to builders of research and power reactors, plus a potential $8-million export business, should also be added to the instrument industry's prospects.

That's the picture of just one phase of the atomic energy program in which private industry participation is expanding.

Last year, says Council for Technological Advancement, Chicago, AEC issued 18,000 prime contracts which resulted in over 375,000 subcontracts and purchase orders. In addition, private industry is increasing its expenditures for research and development in the nuclear field, and AEC estimates that by the end of this year $8 million will have been spent by industry alone since 1951.

In addition to radiation instruments, private industry is expanding its operations in these fields: Uranium prospecting, mining and milling; the manufacture of compounds containing radioisotopes for use in research and general use by industry; and in the design and manufacture of atomic energy equipment for private companies.

POTENTIAL SALES IN NEXT 5 YEARS

MARKETS	MILLION
AEC	$45
Defense	$35
Private Industry	$25
Medicine	$20
Civil Defense	$30
Mining	$15
Export	$8
Other Gov't.	$5
Other Isotope Users	$10
Research and Power Reactors	$5
	$198

Van Norman Co.'s James Scott says . . .

Export Market Can Be Sold

EVEN THOUGH England as a market for machine tools has been virtually closed for many years due to license and exchange restrictions, Van Norman Co., Springfield, Mass., shipped six of its most expensive machines to a private customer there in September of this year.

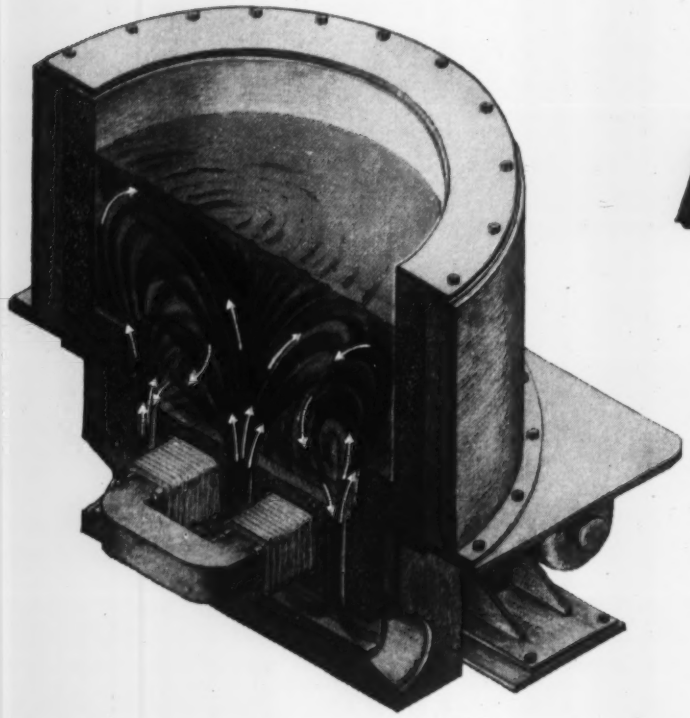
In fact, for a good part of that month about 40 per cent of the company's total business came from export sources, including Southern Korea, Philippines, England, Mexico, Belgian Congo, Colombia, Iran, Brazil and Venezuela. In one three-year period more than 40 per cent of Van Norman's total manufactured products was shipped out of the country (a good record even for the export-conscious machine tool industry), and one division of the company still ships over 25 per cent of its total output overseas.

Big Point — Those experiences are a case in point that despite all the adverse conditions presently plaguing export trade, U. S. firms can develop a profitable overseas business, concluded James Y. Scott, president of Van Norman Co., in a talk before the Manufacturers Association of Connecticut Inc.

Does Van Norman Co. have a special formula for finding export business? No, says Mr. Scott, ". . . we do not have a sinecure as we are competing in these markets with English, Italian, Spanish and Danish manufacturers for this business as well as our own local manufacturers."

Check Points—Mr. Scott does stress these points in attempts to expand export business: Top management must be convinced of the worth of export business; export managers should report directly to top management and not to domestic sales chiefs; and the export department should not be "turned on and off" at the whim of management (". . . there are always some markets open in some sections of the world which will buy some of your products. Our records have shown this to be consistently so.").

The Furnace that Stirs Itself!



ELECTROMAGNETIC PRESSURE CIRCULATES MOLTEN METAL

—In this 60 Cycle—

AJAX TAMA-WYATT *Induction Furnace*

Heat is generated only in the melting channels. Controlled stirring *(neither too much nor too little)* guarantees uniformity of metal temperature and alloy composition and also leads to efficient melting of light scrap. Tiresome puddling is eliminated. The metal is held entirely in an inert refractory lining. The atmosphere is cool and free from contaminating gases.

No Other Method Enables such Completely

CONTROLLED MELTING

Today, AJAX builds a complete line of these time-tested furnaces in standard sizes up to 333 kW for the dependable melting of aluminum, brass, copper and zinc. Units for special applications are carefully engineered to specifications.

TWIN COIL INDUCTORS

Lead Non-Ferrous Melting

The sectional view above shows the twin coil stirring action of the 100 kW Ajax-Tama Wyatt 60 cycle induction furnace. Heat induced in the secondary channels below is conveyed throughout the melt by electromagnetic circulation as shown by the arrows. The 100 kW furnace shown here is one of a family of twin coil furnaces available today for melting rates from 300 to 10,000 lbs. per hour.

AJAX ENGINEERING CORP., TRENTON 7, N. J.

AJAX TAMA-WYATT — **INDUCTION MELTING FURNACE**

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

Retooling V-8 Cost Reo Under $500,000

DETROIT

YOU WON'T find many people to challenge the statement that Reo Motors Inc. is building one of the finest V-8 engines in today's truck field.

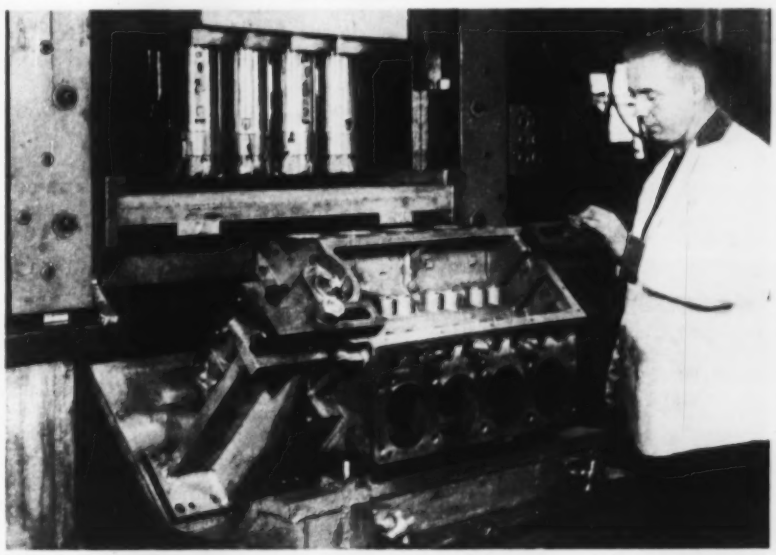
As illustrated in this column last week, the new OHV engine offers wet-sleeve cylinder liners that are replaced inexpensively in case of scoring. It features an oil cooler in the intake manifold, utilizing 800 in. of ¼ in. crimped copper tubing, and it delivers 400 foot-pounds of torque at only 1600 rpm.

Virtually every component of the Reo engine is produced on multi-purpose machine tools. With one exception, every one of them was built in 1926, and many were running off line shafts only a few years ago. Tooled for an amazing figure well under $500,000, thanks to the utilization of equipment already in the plant, this modern engine is being produced by something so antithetical to automation we'll call it "enginuity."

Ingredients—Enginuity involves a realization that low volume will not permit a write-off of special-purpose equipment, plus the use of some good, old fashioned shop mechanics to make the engine parts on what you have in the most efficient way. Reo's approach is every bit as wise as the decision to go to automation where volume does permit it. Although the volume will probably never exceed 200 engines per week with the present setup, quality standards are equal to or higher than automated facilities with the latest in inspection and sizing equipment employed.

A good example is the wrist pin, connecting rod and piston assembly. These are maintained at a constant temperature of 70 degrees F in a pressurized room to eliminate dirt. They are air-sized to 0.00005-in. The bore and shoulder in the block, which receives the cyl-

Finish milling the head surface on the V-8 block is done on a standard Milwaukee-Mil milling machine built in 1926. Note the fixture on the machine to achieve the proper angle of the head surface relative to the milling cutter



Finish boring the cylinders on an Ingersoll boring machine. Newest production machine in the setup, the unit was built five years ago for the six-cylinder engine job. A four-spindle head was purchased to do the V-8 block in two passes

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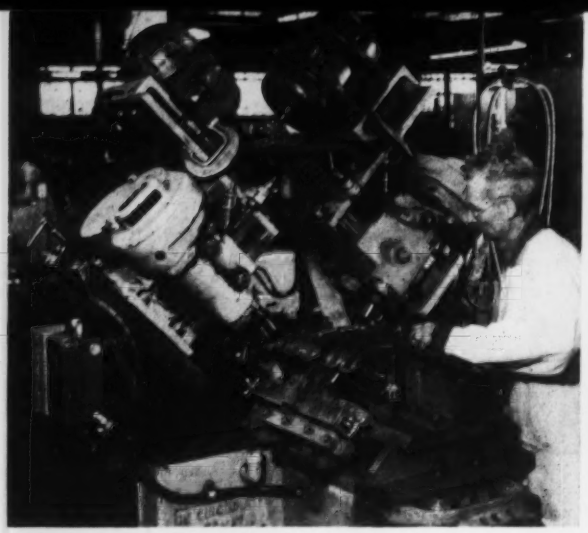
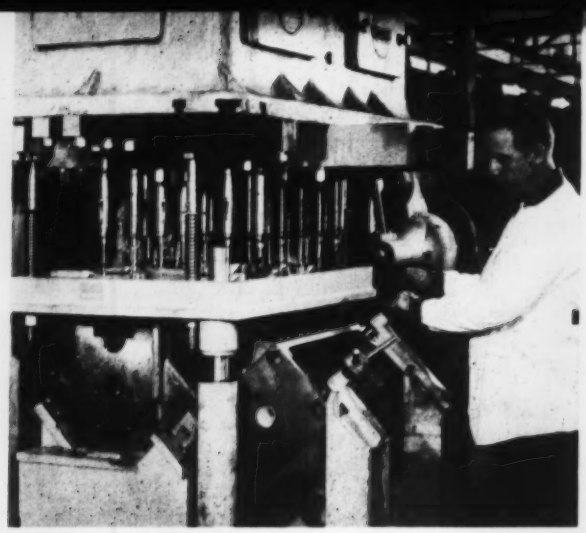


Intake manifolds are milled on a Cincinnati machine. Note in this case the spindle and drive units of the machine, formerly horizontal, have been inclined by adding blocks. Normally, the work piece is inclined in this operation



Multiple drilling done on this Baush machine comes closest to a high-volume line in appearance. Stud holes are drilled for main bearing caps at the same time holes are being drilled in a second, inclined block for cylinder-head studs

inder liner, is held to 0.001 inch on taper.

Particular—Cranks are balanced on the latest in automatic equipment, and the volume of each combustion chamber in the cylinder heads is checked electronically on a Poole Cavitometer to plus or minus 2.5 cc. All components of the basic engine are steam cleaned before they enter the assembly room, which is pressurized to keep dirt out of the area. Other firms use pressurized rooms for highly critical automatic transmission assembly, but Reo believes it is the only firm to assemble its engines under such conditions.

As a final touch, following assembly every new V-8 engine is given a 48-hour run with a water brake test for quality insurance.

Contrast—All this stands somewhat in contrast to the lines, for example, which produce the block. The 41 machines include such memory stirring items as Cincinnati-Bickford horizontal boring machines, with their jigs and horizontal boring bar. Greenlee radials do the drilling and tapping for the flywheel cover and front gear cover as well as tapping all holes in the block. A 20-spindle Baush machine drills the holes in cylinder head faces. Newest machine is a five-year-old Ingersoll on which four boring spindles were substituted for the six used on the six-cylinder model to finish bore the cylinders on one bank of four at a time.

With machines arranged in a line that permits work flow from one machine to the next, the "automation links" are substituted for by an overhead crane system which permits transfer of the block to the next machine without undue manual effort.

Tale of Time — Another story could be told, too, in the amazingly short period of time involved in the tooling. The engine was released only conditionally last December and many parts were not given approval until well into this year.

Then there is the notable adaptability of the engine to production: Wet sleeve construction simplifies foundry coring materially; the crankshaft of cast alloy steel is made so close to finished size that machining is sharply reduced.

Relationship — The relationship of the V-8 to other engines is interesting, too. The liners are interchangeable with the six-cylinder jobs of the firm as are many gears, bushings, the rocker arms and wrist pins. The pistons also will be interchangeable soon, and the firm sees a possible family of engines in the future including a four, a six, a V-8 and a V-12 all using interchangeable components.

A good example of the possible manufacturing economies is supplied by the V-8 cylinder head. The four-cylinder length, through careful design, can be drilled for stud holes, valve guide holes and spark-plug holes on equipment now doing the job for the six with the extra spindles idle. A V-12 probably would utilize two six-cylinder engine heads and perhaps the block could be processed on six-cylinder equipment with suitable jigs and fixtures as the four-cylinder engine might be on the V-8 equipment.

Multipurpose machine tools at the Reo plant still have a bright and efficient future, thanks to enginuity.

Auto, Truck Output

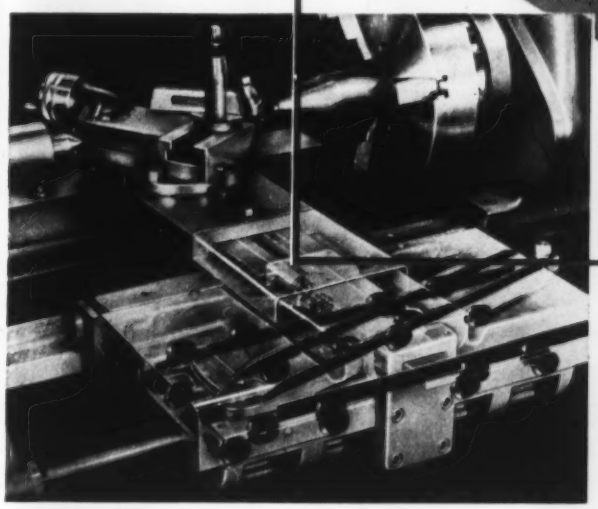
U. S. and Canada

	1954	1953
January	594,789	614,000
February	573,801	628 017
March	672,485	752,149
April	676,233	782,491
May	621,249	684,843
June	623,732	713,778
July	543,534	756,592
August	523,799	640,186
September	364,441	605,228
October	311,968†	651,153
November		457,852
December		529,588
Total		7,815,877

Week Ended	1954	1953
Oct. 9	81,610	148,779
Oct. 16	59,511	152,743
Oct. 23	62,376	149,794
Oct. 30	90,662	145,311
Nov. 6	121,739	133,783
Nov. 13	129,000*	115,748

Source: Ward's Automotive Reports
†Preliminary. *Estimated by STEEL

BALL BEARINGS make a product BETTER



Twenty New Departure ball bearings are used in the Monarch Machine Tool Company's antifriction bearing taper attachment. There are 12 single-row bearings, 8 double-row bearings. All are permanently lubricated.

Many advantages of the Monarch lathe taper attachment are—according to its maker—the result of New Departure **ball** bearings. For by their use, backlash, friction and lost motion are almost entirely eliminated . . . smoother, more accurate tapers are possible. And Monarch's taper attachment takes heavy cuts even when boring or turning acute angles, for **ball** bearings give rigid support under both radial and thrust loads.

Call your New Departure sales engineer. Have him show you how New Departure ball bearings make a good product *even better!*

NOTHING ROLLS LIKE A BALL

NEW DEPARTURE

BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT
Plants also in Meriden, Connecticut, and Sandusky, Ohio

Makes soft jobs out of tough nuts

AFTER hundreds of flight hours, the propeller retaining nut that holds an airplane propeller on its shaft often "freezes". Loosening it used to be an hours-long job. Hand wrenches were ruined in the process. Sometimes the nut had to be cut off.

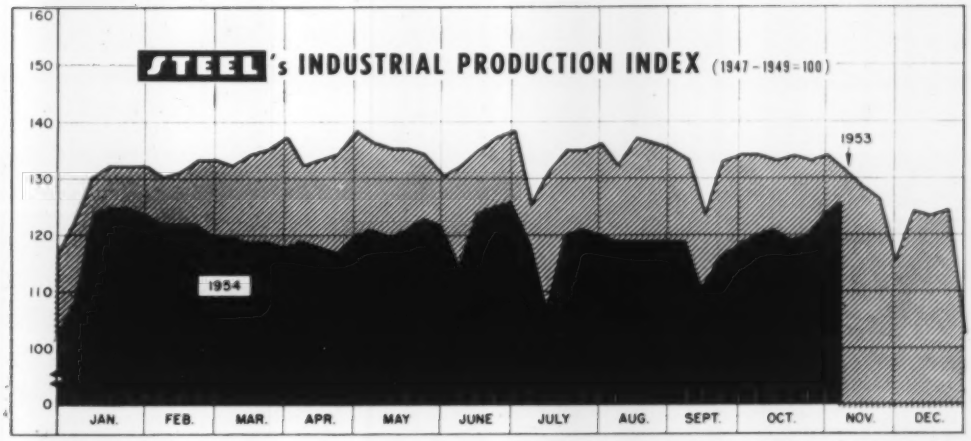
Then someone thought up a hydraulic propeller retaining nut torque wrench. It enabled one man to apply as much as 5,000 pounds feet of torque on the nut—10 times the force he could exert with a 3-foot bar.

But the problem was to develop a wrench socket that would stand up under this pressure. In service, the socket was apt to break or twist out of shape. During the necessary heat treating, it often became distorted and had to be scrapped.

Kell-Strom Tool Company, Inc., of Weathersfield, Connecticut, manufacturers of aircraft propeller tools, took the problem to metallurgists of the Timken Company. After careful study it was recommended that the socket be made from 52100—a Timken® fine alloy steel.

Kell-Strom tried it, found that sockets made from Timken 52100 steel tubing greatly increased the life of the tool. There was less breakage or twisting out of shape. Because 52100 could be heat treated before machining, distortion and scrap were reduced to a minimum. In addition, the splines of the socket were easier to machine than with the steel previously used.

This is only one of the many tough problems stamped "Solved—by Timken Alloy Steel". If you have any tough nuts that need cracking, why not let us help you. Write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO". Tapered Roller Bearings, Alloy Steel and Seamless Tubing, Removable Rock Bits.



LATEST WEEK*	126
PREVIOUS WEEK	124
MONTH AGO	121
YEAR AGO	132

* Week ended Nov. 6.

Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 11%.

Ahead: More Gains in Industrial Production

UP, UP, UP—that's the direction STEEL's industrial production index is taking.

The index jumped 4 points to 124 (1947-1949=100) in the week ended Oct. 30. In the latest week, it's up another 2 points to 126, tying 1954's record set at the end of June. With the resurgent auto industry adding increasing weight, chances are for no level off till the black line gets up around 130.

Crossover — That means that some time in the next couple of weeks, the index will surpass the 1953 line for the first time this year. Some tapering off will be evident in December, though, because of seasonal factors. But that month should be at least as good as its year-ago counterpart.

Autos can be counted on to add at least 2 points to the rise. Production in the first week of November was above 100,000 for the first time this quarter, according to *Ward's Automotive Reports*. The industry is finally getting into high gear, and it should be apparent in the next figuring of the index.

Here's the way the industry stacks up:

Overtime — Chrysler Corp. has worked most of the bugs out of its production lines. But Plymouth has yet to hit its peak. Overtime on many operations is helping swell the output of all divisions. With introduction date only days away, the aim is to be ready for the expected flood of orders.

Ford will be running at near capacity to catch up with the lead Chevrolet has managed to build up by virtue of its earlier debut. Top speed is approaching at Lincoln and Mercury, too.

Full Speed—In the General Motors stable, Chevrolet is pushing out about 30,000 cars a week. That level will hold for a few weeks at least. Pontiac's latest weekly output topped all but one week of

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,842	1,822	2,081
Electric Power Distributed (million kwhr)	9,067[1]	9,152	8,398
Bitum. Coal Output (daily av.—1000 tons)	1,500	1,472	1,517
Petroleum Production (daily av.—1000 bbl)	6,139[1]	6,153	6,130
Construction Volume (ENR—millions)	$287.1	$220.2	$358.4
Automobile, Truck Output (Ward's—units)	121,739	90,662	133,783
TRADE			
Freight Car Loadings (unit—1000 cars)	708[1]	736	748
Business Failures (Dun & Bradstreet, no.)	220[1]	223	207
Currency in Circulation (millions)[3]	$30,138	$29,970	$30,428
Dept. Store Sales (changes from year ago)[3]	+4%	+9%	−2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$18,568	$18,615	$17,495
Federal Gross Debt (billions)	$278.8	$278.7	$273.4
Bond Volume, NYSE (millions)	$14.4	$16.6	$13.3
Stocks Sales, NYSE (thousands of shares)	10,561	10,489	6,253
Loans and Investments (billions)[4]	$84.8	$84.7	$79.5
U. S. Gov't. Obligations Held (billions)[4]	$37.5	$37.4	$31.8
PRICES			
STEEL's Finished Steel Price Index[5]	194.53	194.53	189.38
STEEL's Nonferrous Metal Price Index[6]	218.3	218.4	204.3
All Commodities[7]	109.7	109.6	109.9
Commodities Other Than Farm & Foods[7]	114.6	114.5	114.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1954, 2,384,549. 1953, 2,254,459. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

TOUGH on the hands

Every time a worker's hands are snared by jagged metal, production suffers, and insurance men take a second look at rates. Skilled hands should never be bare hands. Protect them with Jomac® Work Gloves. Jomacs, made of rugged, springy, twisted-loop fabric, cut accident rates in plants throughout the country. Jomacs are low in cost because they wear so long. Write today for our new catalog.

Send for a free sample of Jomacs. Describe your operations, temperature conditions, etc. We'll gladly recommend an economical Jomac Work Glove and send you a sample pair. Jomac Inc., Dept. E, Philadelphia 38, Pa.

It pays to keep Jomacs on hand

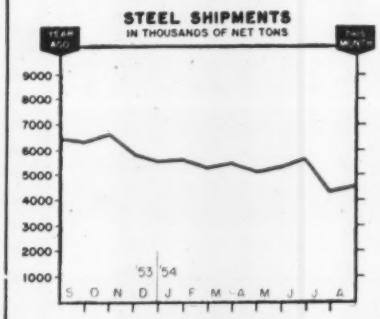
JOMAC

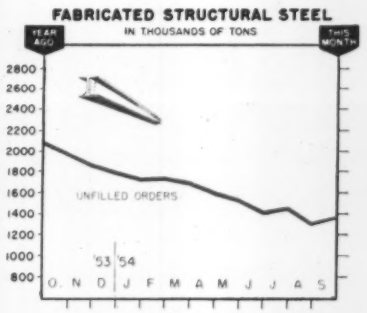
INDUSTRIAL WORK GLOVES

Outwear ordinary work gloves by 900%

Plants in Philadelphia, Pa., and Warsaw, Ind.

THE BUSINESS TREND





Net Tons

	1954	1953	1952
Jan.	5,727,600	7,067,636	6,589,193
Feb.	5,364,978	6,533,227	6,358,293
Mar.	5,583,690	7,436,919	6,890,391
Apr.	5,287,972	7,162,460	5,922,173
May	5,423,168	7,209,396	5,947,450
June	5,887,488	6,950,059	1,250,243
July	4,490,179	6,582,513	1,413,672
Aug.	4,681,242	6,498,805	6,312,118
Sept.	.....	6,400,757	6,542,147
Oct.	.....	6,726,550	7,155,611
Nov.	.....	5,903,980	6,647,725
Dec.	.....	5,684,920	7,105,382

American Iron & Steel Institute.

Shipments and Backlogs

	Shipments 1954	Shipments 1953	Backlogs 1954	Backlogs 1953
Jan.	245.6	241.4	1,686	2,180
Feb.	253.1	251.1	1,697	2,128
Mar.	285.4	266.3	1,645	2,155
Apr.	293.5	263.2	1,546	2,168
May	253.9	263.8	1,490	2,179
June	290.3	274.6	1,391	2,153
July	285.2	230.3	1,429	2,134
Aug.	272.5	251.1	1,270	2,122
Sept.	265.4	255.6	1,329	2,041
Oct.	....	295.5	....	1,927
Nov.	....	257.8	....	1,804
Dec.	....	266.9	....	1,741
Total	....	3,117.6		

American Institute of Steel Construction

Charts copyright 1954 STEEL.

the 1954 model run. Oldsmobile is at full throttle, and Buick is coming along fast. Cadillac is well under way, too.

Among the independents, Studebaker is making an extremely good showing with production at the highest level of the year. Lower prices and higher horsepower appear to have worked their magic on customers. Packard's lines have been moved to their new location and should get into production this week.

Moving Day—American Motors reports its output at Kenosha, Wis., is at the highest daily level since last January. Hudson has ended its Detroit career and is in the process of moving to Kenosha and Milwaukee to be integrated with Nash. Building of '55 Hudsons will begin in December.

Kaiser production is still down, but Willys put out the first of its new cars after an 81-day lapse. Kaiser reports tooling for a '55 line, but no output is reported. Cars will probably be shown sometime in January.

Bargain Day Is Over . . .

Adding to the rosy picture in the auto industry are new car inventories, at the lowest point since mid-1952. Stocks are well under a 30-day supply. Many dealers have sold their '54 stocks, many others are down to just one or two cars. All of which points to slim pickings for bargain hunters and a banner kickoff to the 1955 sales year.

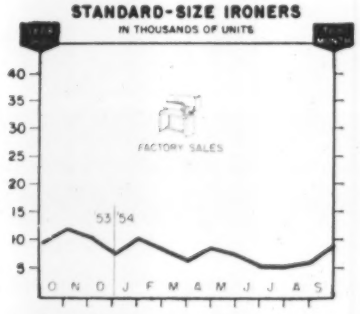
Improvement is also noted in truck buying, and November production schedules are being pushed ahead as a result. The outlook is for the production of about 86,500 trucks this month, about 20,000 more than in October.

New Goal: 80 Per Cent . . .

That means more strength for the continuing pickup in the steel industry. The operating rate has been on a more or less steady climb since mid-year. Small week-to-week increases will continue, with 80 per cent of capacity likely to be hit before the end of the year.

High electricity consumption will help STEEL's index in its pickup. Predictions on electrical output are for an over-the-year increase of about 7 per cent during 1954. This is an upward revision from summer when the increase was expected to be only a little over 5 per cent.

STANDARD-SIZE IRONERS
IN THOUSANDS OF UNITS

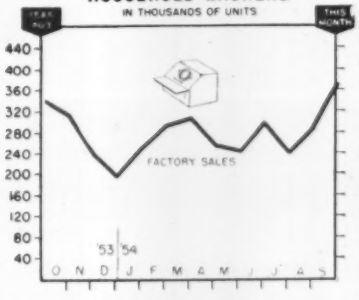


Factory Sales—Units

	1954	1953	1952
Jan.	9,792	24,395	15,636
Feb.	8,203	22,586	17,630
Mar.	6,025	16,066	13,913
Apr.	8,388	14,060	8,938
May	7,210	9,323	12,652
June	5,185	12,529	17,654
July	5,227	9,626	15,025
Aug.	5,925	8,067	16,477
Sept.	8,905	9,113	22,492
Oct.	....	11,666	25,204
Nov.	....	10,105	19,724
Dec.	....	6,908	16,798
Totals	....	154,464	202,143

American Home Laundry Mfrs. Assn.

HOUSEHOLD WASHERS
IN THOUSANDS OF UNITS



Sales Billed—Units

	1954	1953	1952
Jan.	249,956	277,309	213,998
Feb.	296,171	326,604	255,864
Mar.	307,862	345,989	248,431
Apr.	258,712	288,474	217,211
May	246,944	286,515	213,668
June	303,456	304,086	274,457
July	242,863	228,268	207,593
Aug.	293,243	291,260	254,537
Sept.	379,666	340,532	283,732
Oct.	....	310,867	327,814
Nov.	....	238,153	293,079
Dec.	....	191,570	310,661
Totals	....	3,429,627	3,101,045

American Home Laundry Mfrs. Assn.

Railroad freight car loadings have shown surprising strength during the past few weeks. But it's likely they will contribute to any slackening of the production index during December. A seasonal dip in loadings usually comes at that time of year.

Another Record . . .

Construction in October showed a small seasonal decline, but still set a record for the month, according to the Commerce and Labor departments. New work set in place hit $3.5 billion—3 per cent under September but 8 per cent higher than October, 1953.

Private spending is what's keeping the boom alive. Residential building alone accounted for nearly $11 billion in the January-October period. That's about half of total private outlays and well above the total spent for all types of public construction combined.

Higher Sales Coming . . .

Plenty of backing is on hand for supporters of the idea that the business upturn is here. A Dun & Bradstreet Inc. survey of businessmen shows that 56 per cent of executives expect to have higher sales in first quarter, 1955, than they had a year earlier. The latest survey is the first in over a year in which a majority of respondents expected such an increase.

Along with higher sales, higher after-tax profits are anticipated by 43 per cent. Especially encouraging is that more executives are predicting increases in inventory. Offsetting that good news: Almost as many expect a decrease. Still, in previous 1954 surveys, says Dun & Bradstreet, those planning stock reductions consistently outnumbered those planning increases.

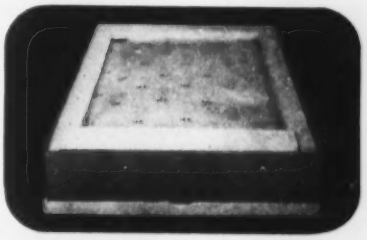
Job Prospects Gain . . .

A slight gain in employment also is coming. About 20 per cent of respondents expect to change from present employment levels. Of those the number planning more hiring was more than double those expecting cuts.

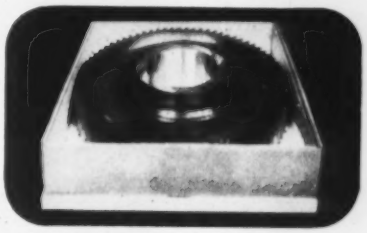
Interesting is the fact that manufacturers are most prominent among businesses planning to add to payrolls, confirming to some extent reports of increasing new orders. More orders are expected by 51 per cent of the durable goods manufacturers surveyed and by 59 per cent of nondurable producers.

HOW MARVELLUM vpi® WRAP Speeds Assembly of Diesel-Electric Locomotives

Part arrives at assembly plant in steel-strapped skidded carton ready for stand-by storage.



Removal of carton top reveals rust-preventive VPI cover sheet held in place by top blocking.



Gear, on bottom sheet of VPI paper, is clean, bright and ready for immediate installation. No messy, time-consuming degreasing delays the assembly of General Electric diesel-electric locomotives.

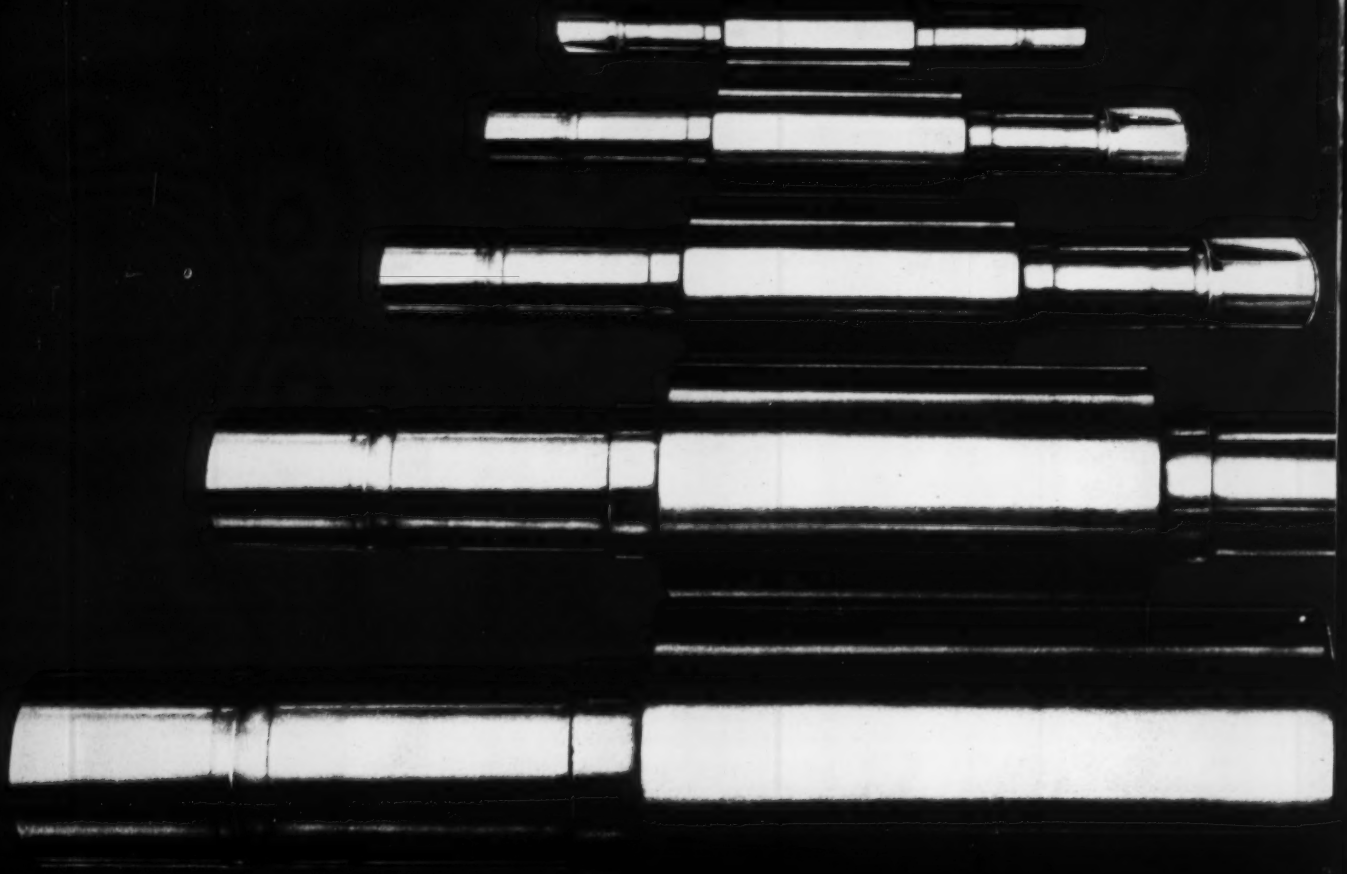
In shipment and storage, Marvellum VPI Wrap positively protects parts against rust. A special coating on the paper vaporizes and forms an invisible protective film around the item packed, preventing corrosion. Wherever prevention of rust is a factor, you can save time and money with VPI. To get all the facts about this revolutionary protective wrap, write for our fully descriptive booklet and generous VPI sample. Our technicians will be glad to discuss corrosion problems peculiar to your plant.

Marvellum VPI Wrap is made in compliance with Military Packaging Specification MIL-P-3420.

The MARVELLUM COMPANY
1 Appleton St., Holyoke, Mass.

Ohio Rolls

SHAPING METAL FOR ALL INDUSTRY



Choose from 11 Types of Ohio Iron and Steel Rolls

THE OHIO STEEL FOUNDRY CO.

RONALD D. GUMBERT
. . . heads Alloy Precision Castings

Ronald D. Gumbert was elected president and a director, **Alloy Precision Castings Co.**, Cleveland. He has served as executive vice president for the last two years. Before joining Alloy Precision, he was production superintendent of the Pittsburgh plant of Armstrong Cork Co.

Earl P. Leeds transfers from machine tool sales to become director of industrial products sales at **Brown & Sharpe Mfg. Co.**, Providence, R. I. **Albert Anforth,** effective Dec. 1, will be representative in the Los Angeles office.

W. S. Rheem was elected president and **Frank G. Fisher** vice president and general manager of **U. S. Spring & Bumper Co.**, Los Angeles. **John R. Rauen Sr.,** former president, was elected chairman of the board. The company was acquired by Rheem Mfg. Co. earlier this year as a division. Mr. Rheem is general manager of the parent company. Mr. Fisher, before joining Rheem, was vice president, general manager and a director of Houdaille-Hershey Corp.

John P. Sherlock joined **Luntz Iron & Steel Co.**, Canton, O., to assist **Herbert R. Aronoff** who is in charge of the Pittsburgh office. Mr. Sherlock formerly was purchasing agent for McConway & Torley Corp.

CLARK H. JOHNSON
. . . United Engineering v. p.-sales

Clark H. Johnson, manager, machinery sales, was elected vice president-sales, **United Engineering & Foundry Co.**, Pittsburgh. He succeeds **William Hagel,** who was made vice president and executive assistant. **J. N. Mager** was appointed manager of roll sales. He succeeds **Horace Mager,** vice president in charge of roll sales and steel castings, who retires Dec. 1.

Ralph A. Rockwell was made chief engineer, valve division, **Minneapolis-Honeywell Regulator Co.**, Minneapolis.

Robert P. McKenrick was promoted to vice president-general manager of **Blaw-Knox Co.'s** newly formed construction equipment division at Mattoon, Ill. He remains in Pittsburgh until completion of the new Mattoon plant.

Hubbell Metals Inc., St. Louis, elected **Donald M. Hanson** vice president-merchandising. He continues as manager, brass and copper department. **Charles D. Mill** was elected vice president in charge of production and continues as superintendent-warehouses. **R. E. Hasselbring,** manager of the aluminum department and sales manager of the inside salesmen, will also serve as secretary. **Earl R. Gruebbel,** manager, accessories department, will be assistant secretary.

WALTER F. HINKLE
. . . Acme Steel v. p.-engineering

Walter F. Hinkle was elected vice president of engineering, **Acme Steel Co.**, Chicago. He continues direction of all engineering activities of the company and also is in charge of the mechanical and electrical divisions.

William H. Sparr Jr. was appointed in charge of the steel section, nickel sales department, **International Nickel Co. Inc.** He transfers to New York. He formerly was head of the development and research division's technical field section in Pittsburgh.

P. G. Boyd, Youngstown Sheet & Tube Co.'s Chicago district sales manager, was promoted to the newly created position of western manager of sales. He will supervise district sales offices in Chicago, Des Moines, Grand Rapids, Indianapolis, Kansas City, Milwaukee, Minneapolis and St. Louis. **C. Hix Jones** becomes Chicago district sales manager, and **David H. Goodfellow** succeeds Mr. Jones as Detroit manager.

J. D. Warfield was appointed assistant manager of **Westinghouse Electric Corp.'s** gearing division, Pittsburgh. He will also act as vice president-general manager of **Schneider Mfg. Co.**, Muncie, Ind., recently purchased by Westinghouse.

Carl J. Ricker was made chief

JOSEPH LEAVERTON
. . . Hamilton Foundry chief indus. eng.

WILLIAM F. ZARBAUGH
. . . v. p., Cold Metal Products

JOHN M. TUTHILL
. . . Youngstown Sheet & Tube sales mgr.

sales engineer, **E. W. Bliss Co.'s** Hastings, Mich., division. He replaces **Guy Prettyman**, retired.

Joseph Leaverton was made chief industrial engineer of **Hamilton Foundry & Machine Co.**, Hamilton, O. He was production engineer.

Fred C. T. Daniels retired as vice president-research and development, **Mackintosh-Hemphill Co.**, Pittsburgh.

Robert B. Leggat was promoted from purchasing agent to director of purchases for **Granite City Steel Co.**, Granite City, Ill.

Cold Metal Products Co., Youngstown, appointed **William F. Zarbaugh** a vice president, with responsibilities relating to the parent company and its subsidiaries. **E. V. Mort** was made assistant general superintendent of the Youngstown plant. He formerly served as manager of operations at Kenilworth Steel Co., a subsidiary.

V. H. Gordon, assistant purchasing agent, was promoted to purchasing agent of **Thew Shovel Co.**, Lorain, O. He was director of purchases at Cleveland Co-operative Stove & Foundry Co. before joining Thew Shovel in 1946.

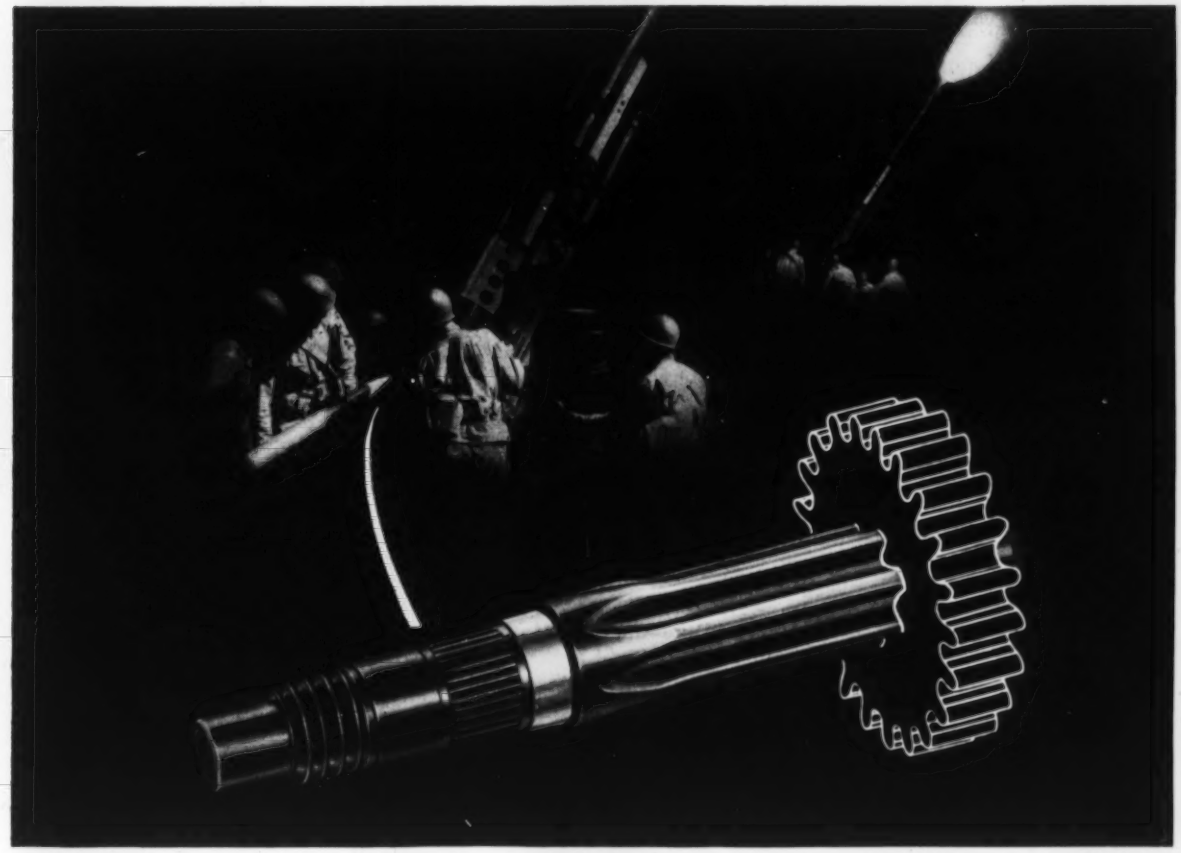
John M. Tuthill, assistant general manager of sales, was made general manager of sales, **Youngstown Sheet & Tube Co.** Now located in the Chicago office, he transfers to Youngstown. **John P. DeHetre**, who was made an assistant general manager of sales last June, with office in Youngstown, transfers to Chicago to succeed Mr. Tuthill.

Donald O. Dice was named manager-marketing for the specialty control department, **General Electric Co.**, Schenectady, N. Y. He replaces **J. Penn Rutherfoord** who now serves as consultant, manager development, in GE's manage-

ROBERT B. LEGGAT
. . . Granite City purchasing dir.

V. H. GORDON
. . . Thew Shovel purchasing agent

DONALD O. DICE
. . . GE dept. marketing manager



What has an ack-ack shell fuze to do with your present problem?

Plenty... as you'll see

You'll find this "flash channel" in time-and-point detonated shell fuzes that make our antiaircraft guns deadly to enemy planes.

The channel is Superior tubing—lead-pencil size. Along it races the flash-through—from point detonator to main powder charge—that explodes the shell on impact. The same tubing serves as a pinion in the gear train of a mechanical detonator, which explodes the shell at a set altitude. Result: double deadliness for ack-ack.

What about your problems? Wait just a moment . . .

Trouble was that flash-through must travel a perfectly straight path to prevent misfires. Ordnance had the dickens' own time with this problem. Flash channels of drilled bar stock proved untrustworthy. And it wasn't until Ordnance called on Superior that the puzzle was licked. A special grade of heavy wall Superior tubing—precision drawn Type C1118 carbon steel—proved perfect for the multiple close-tolerance machining needed to make the fuze part.

Now! You may need tubing made with the same accuracy essential in flash channels. And much of it may require special dimensions, shapes, even analyses. Superior makes a specialty of such special tubing. For example, you'll encounter Superior tubing in hypodermic needles, heat exchanger coils, truck wheel bushings, jet-engine ignition harness, and electronic parts of many kinds.

Superior will be happy to work with you in developing, designing and producing the tubing you need. If you have a problem involving tubing, get in touch with us. Write for a FREE copy of Superior's 40 page Carbon and Alloy Steel Catalog and more information on special tubing. Superior Tube Company, 2005 Germantown Ave., Norristown, Pa.

Round and shaped tubing available in Carbon, Alloy and Stainless Steels; Nickel and Nickel Alloys; Beryllium Copper; Titanium; Zirconium

Superior Tube

THE BIG NAME IN SMALL TUBING

All analyses .010" to ⅜" O.D.
Certain analyses in light walls up to 2½" O.D.

West Coast: Pacific Tube Company, 5710 Smithway St., Los Angeles 22, Calif. • RAymond 3-1331

ment consultation services division in New York.

Raymond E. Hewlett was made staff project engineer and **Brent C. Jacob Jr.**, chief industrial engineer of **Chrysler Division**, Chrysler Corp., Detroit. Mr. Hewlett was general works manager of the Chrysler tank engine division, operating the Army's Michoud Ordnance plant in New Orleans. Mr. Jacob, since 1952, has been supervisor of quality inspection.

Hamilton M. Ross was made manager of operations, conveyors division, **Hewitt-Robbins Inc.**, Stamford, Conn. **Harold E. Murken** was made manager of conveyor system sales.

Lukens Steel Co., Coatesville, Pa., appointed **Eugene M. Smith** assistant director of research. He was with Youngstown Sheet & Tube Co., serving as development engineer in the mill research and development department.

David L. Murphy was appointed superintendent of the Hammond, Ind., wheel foundry of **Pullman-Standard Car Mfg. Co.** He succeeds the late **H. S. Schlettert.**

Harry Engvall, chief engineer, turbine and gear departments, **De Laval Steam Turbine Co.**, Trenton, N. J., was promoted to executive engineer. His former duties are assumed by **John S. Haverstick**, former chief research engineer.

Thomas A. Mero was named Grand Rapids, Mich., branch manager for **Kaiser Aluminum & Chemical Sales Inc. Paul Ziegler**, director of Kaiser Aluminum & Chemical Corp.'s department of metallurgical research at Spokane, Wash., soon will move to company headquarters at Oakland, Calif.

J. L. BROWN JR.

CHARLES T. LAWSON

. . . American Motors Corp. appointments

J. L. Brown Jr. was elected vice president, **American Motors Corp.**, Detroit, and will also serve as assistant to the president and as a member of the corporation's policy board. **Charles T. Lawson** was elected executive vice president in charge of the appliance divisions, which include the Kelvinator Division, Altorfer Bros. Co. and appliance research engineering. **B. A. Chapman** was elected vice president-general manager, Kelvinator Division. **Elmer W. Bernitt** was elected vice president in charge of manufacturing and procurement for the automotive division.

Harry G. Peacor was appointed regional manager for **All-State Welding Alloys Co. Inc.**, to cover northwestern U. S. and western Canada. He has headquarters at Portland, Oreg.

Ray E. Fleeson was appointed to the Chicago district office's sales staff, tubular products division, **Babcock & Wilcox Co.** He was in charge of the Cleveland suboffice of the Beaver Falls, Pa., district office.

J. H. Bowman Jr. was made manager of sales, **American Steel Band Co.**, Carnegie, Pa.

Pittsburgh Steel Co., Pittsburgh, appointed **Paul Totten** assistant superintendent of its sheet division; **Anthony Thomas**, superintendent of its hot strip mill; and **William C. Ackerman**, superintendent of cold reduction and finishing.

Donald A. Sinke was made chief industrial engineer, **Square D Co.**, at Milwaukee. He succeeds the late **Noble Hall.**

L. P. Reiterman was elected vice president-sales, **Colbert Die Cast Co.**, South Gate, Calif.

C. W. Snider was made assistant to the director of sales, **Gar Wood Industries**, Wayne, Mich.

OBITUARIES . . .

William Adam Jr., president, **Ajax Electric Co. Inc.**, Philadelphia, died Nov. 1.

Walton L. Woody, 63, vice president-operations, **National Malleable & Steel Castings Co.**, Cleveland, died Oct. 30.

Lawrence E. Joseph, 58, a former vice president and director, **Blaw-Knox Co.**, Pittsburgh, died Oct. 28.

George H. Rupp, manager of the mining department of **Colorado Fuel & Iron Corp.** at Pueblo, Colo., died Oct. 11.

Arthur R. Purdy, 38, president, **A. R. Purdy Co. Inc.**, Lyndhurst, N. J., died of an attack of bulbar spinal polio Nov. 3.

A. J. Edgcomb, co-owner of **Edgcomb Engineering & Engraving Co.**, Burbank, Calif., died Oct. 27.

Julius Simon, 57, vice president-treasurer, **Germanow-Simon Machine Co.**, Rochester, N. Y., died Oct. 25.

Ralph G. Farrell, 62, chairman, **Fairmont Aluminum Co.**, Fairmont, W. Va., died Oct. 29.

In this advertisement we continue to take you through a typical day in the life of John Q. Citizen...showing you the part CF&I-Wickwire Wire plays in his everyday activities.

OFFICE BUILDING—8:55A.M. John never stops to think about it but he rides up to work on dependable elevator cable. Without this indispensable wire product—much of it made of CF&I-Wickwire Wire—modern multi-story buildings would be unable to function.

OFFICE—9:00 A.M. Here we are, inside John's office. Where is the wire? All around us. Paper clips inside the desks. Springs inside the telephones and the typewriters—even under John's swivel chair. Staples, coat hangers, ring binders—these and countless other office necessities are made from wire—very often of CF&I-Wickwire Wire.

FACTORY—3:00 P.M. Let's accompany John on a trip to his firm's nearby factory. The premises are inclosed by a wire fence. Inside, we find wire mesh cloth used as machinery guards. Metal processing belts made of woven wire. Springs of every variety to keep the machines going. All of these products use CF&I-Wickwire Wire.

Watch for the balance of John's day in our next advertisement which takes John back to his home and the relaxation of his living room.

For the Wire You Require — Check CF&I-Wickwire

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia
THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Ft. Worth • Houston
Lincoln (Neb.) • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • Seattle • Spokane • Wichita

2692

From coast-to-coast, A. P. GREEN warehouse stocks are available for immediate delivery to your plant . . .

You Lower Your Capital Investment . . . Your capital is not tied up in warehouse space.

You Lower Your Inventory Costs . . . You have on hand only the refractories you need . . . immediately.

You Lower Your Inventory Losses . . . You buy on current prices . . . there's no danger of losing money due to price declines or breakage while in storage.

You Increase Production Space . . . By freeing storage space for more profitable use.

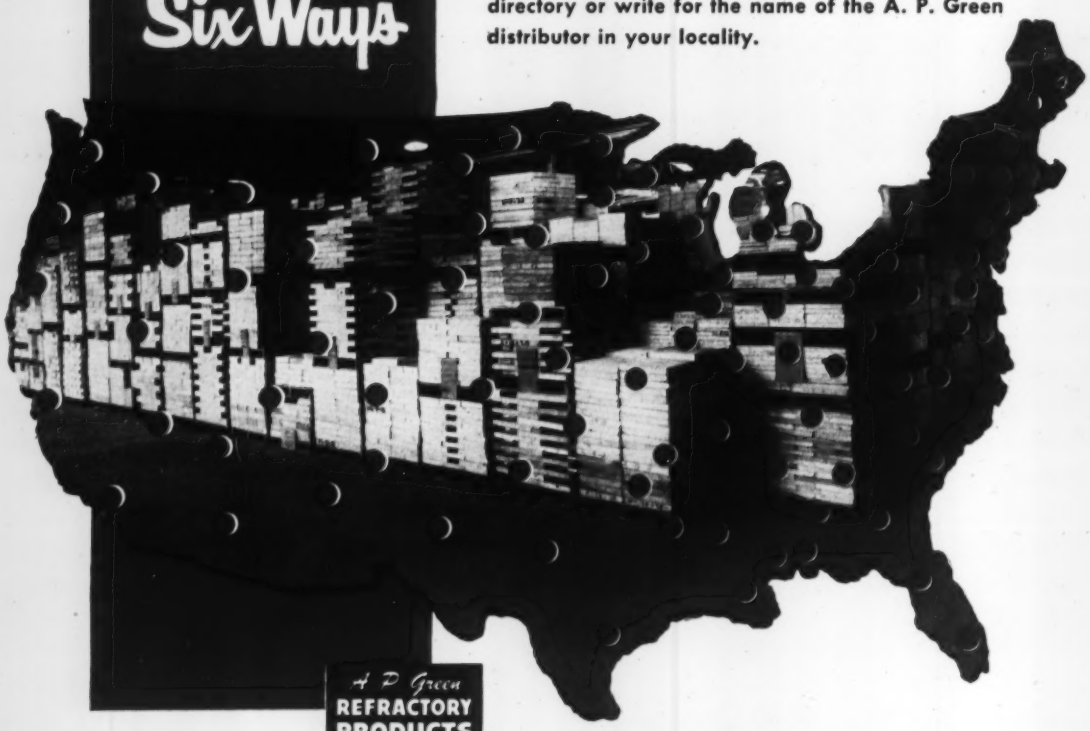
You Lower Labor Costs . . . A. P. Green refractories are delivered to the point of usage. There's no inplant moving by your workers.

You Maintain Steady Production . . . With less down time. A. P. Green warehouse stocks are complete and are available for immediate delivery.

Look in the classified section of your telephone directory or write for the name of the A. P. Green distributor in your locality.

THERE'S AN A. P. GREEN WAREHOUSE STOCK NEARBY

...to Save You Money Six Ways



A P Green
REFRACTORY PRODUCTS

A. P. GREEN FIRE BRICK COMPANY
Mexico, Missouri, U. S. A.
PLANTS: Mexico, Mo. • Woodbridge, N. J. • Sulphur Springs, Texas
In Canada: A. P. GREEN FIRE BRICK COMPANY, LTD.
Toronto 15, Ontario

Weirton Expanding Mill

Facilities in new tin mill building will include cleaning and annealing line

CONSTRUCTION is under way on a four-story building to house a continuous cleaning and annealing line and other facilities at Weirton Steel Co.'s Weirton, W. Va., tin mill. It's to be completed in mid-1955. The firm's electrolytic tin plating lines were modernized earlier this year (STEEL, Aug. 30, page 57).

The new line will be on the fourth floor; electrical substations and hydraulic, air cleaning and neutral atmosphere equipment will be on the third floor; tin plate warehouse storage, the first and second.

The continuous cleaning and annealing line at the subsidiary of the National Steel Corp. will handle 60,000-lb coils of cold-rolled strip steel up to 45-in. wide in tin plate gages at 2000 fpm. Steel coils from the tandem mills will go to the line, which will clean and anneal 60 tons of strip per hour. From there coils ready for skin rolling and tin plating will be transported over a bridge to the present tin mill annealing building.

Unique Looping—Since the new line will be on the fourth floor of the building, the looping pits will go down into the structure, permitting looping of from 700 to 1000 ft of strip in each pit.

A large elevator will service all floors of the building which houses the cleaning and annealing line. Small fork trucks will be used to move material in the tin plate warehouse. A 30-ton crane will be installed 38 ft above the fourth or operating floor for lifting coils and other material. The building connecting the tin mill and the new structure will house four shearing lines.

Stamping Firm Expands

Completion of an expansion program at the Aircraft Division of Ledkote Products Co. of New York Inc. places it among the leading producers of aircraft metal stampings and assemblies. A 15,000-sq-ft Kirksite foundry has been completed and three Cecostamps were installed at the Long Island City, N. Y., firm, which now has 20 drop hammers in operation. The division makes stampings, airplane exhaust manifolds and assemblies.

Berry Opens Chicago Office

Oliver Iron & Steel Corp.'s Berry Division opened sales and engineering offices at 4227 W. 43rd St., Chicago. W. L. Denniston is the Chicago district sales engineer, handling the division's hydraulic pumps, motors, controls and transmissions.

Thompson Acquires Kolcast

Thompson Products Inc. acquired Kolcast Industries Inc., both of Cleveland, and will operate the property as a wholly owned subsidiary. Kolcast produces frozen mercury castings, particularly large ones for jet aircraft engines. Thompson is a leading producer of automotive, aircraft and electronics parts and has pioneered in the investment casting field. It concentrates on small, precision castings made by the frozen mercury process, under license from Mercast Corp., New York.

California Firm Changes Hands

Engineered Instruments Inc., Hayward, Calif., purchased D-V Welding Controls, Oakland, Calif., maker of specialized controls for the automatic starting and stopping of motor-driven d-c arc welding equipment. George C. Lydiksen will head sales of the D-V Control Division.

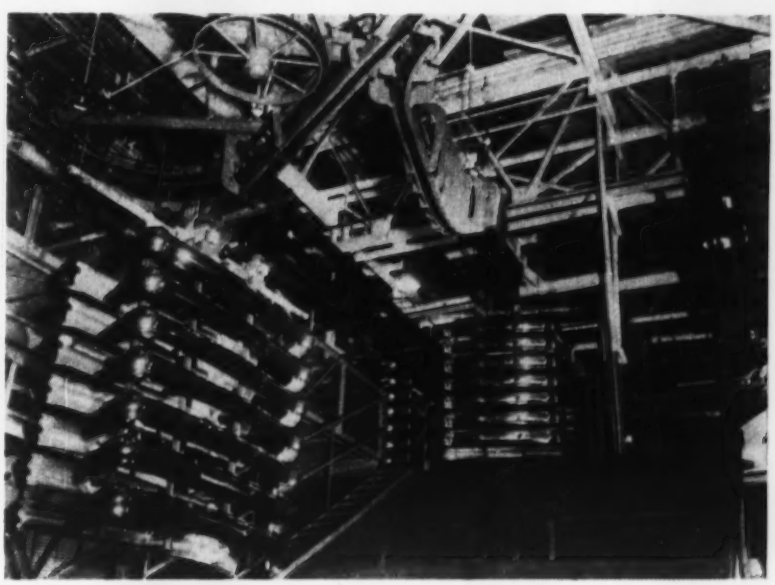
Wheeler Broadens Services

Crouch Associates, Cleveland, have affiliated with Wheeler Associates Inc., that city, an organization of industrial and management consultants. R. Pat Crouch, whose firm specializes on operations research, will head the new OR department. With it, Wheeler Associates Inc. are offering 15 separate and allied services to American and Canadian industry.

Elgin Buys Neomatic Inc.

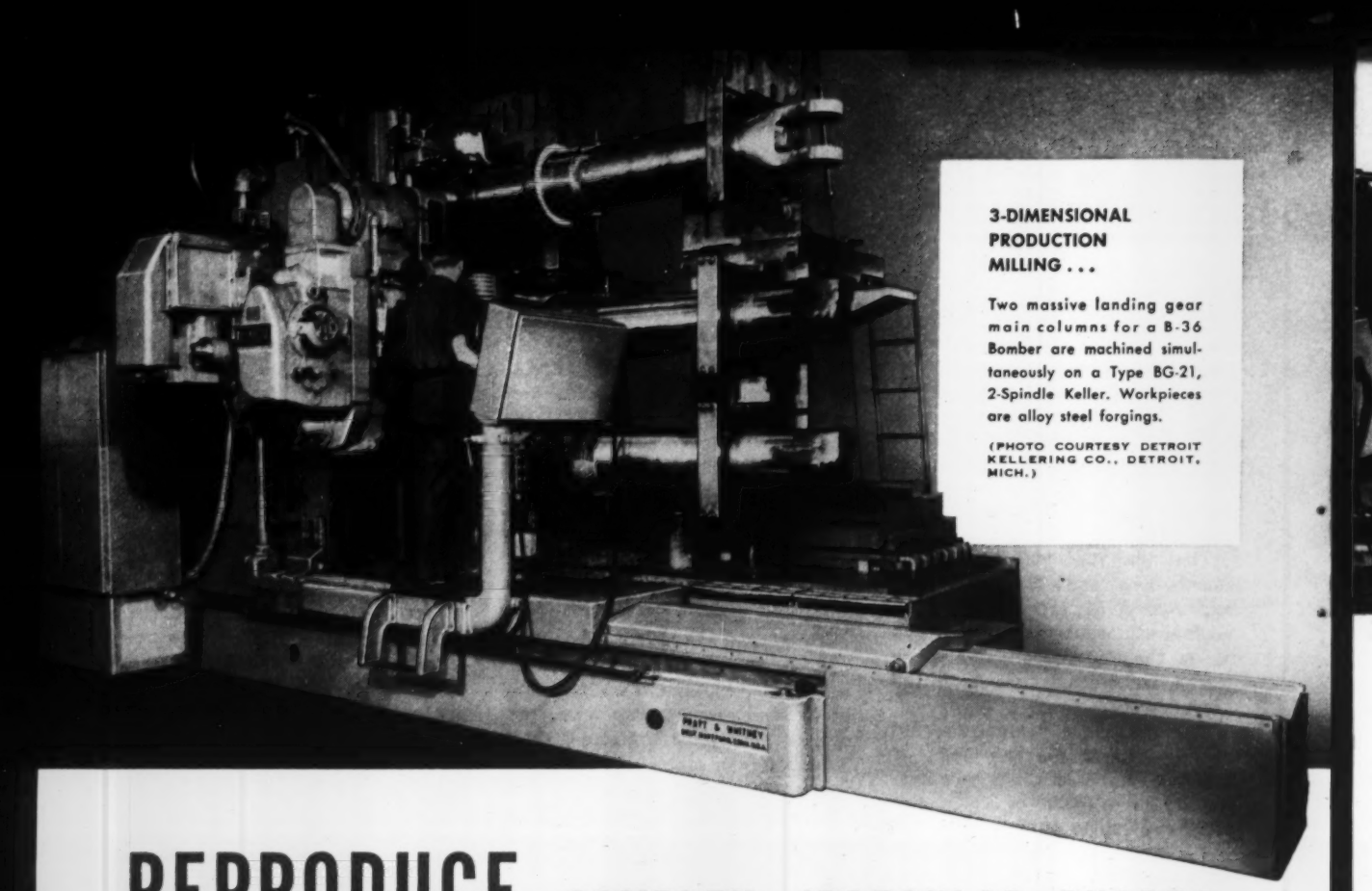
Elgin National Watch Co., Elgin, Ill., entered the West Coast electronics manufacturing field with the purchase of Neomatic Inc., Los Angeles, specialist in development of miniature electronic components. Neomatic's production of

(*Please turn to page* 116)



Smooth Ride for Oldsmobile Bumpers

Modern techniques in electroplating and automatic materials handling are featured in the new facilities at Oldsmobile's bumper manufacturing plant. Point at which several conveyor lines converge in the plant is called "Grand Central Station." Handling 2500 bumper bars at one time, the conveyors process them through 37 plating tanks for succeeding coats of copper, nickel and chrome



3-DIMENSIONAL PRODUCTION MILLING . . .

Two massive landing gear main columns for a B-36 Bomber are machined simultaneously on a Type BG-21, 2-Spindle Keller. Workpieces are alloy steel forgings.

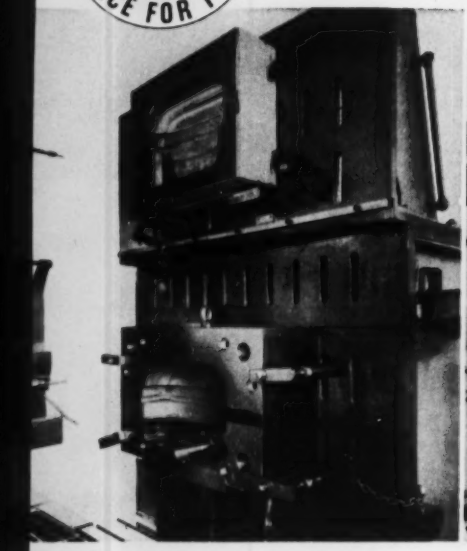
(PHOTO COURTESY DETROIT KELLERING CO., DETROIT, MICH.)

REPRODUCE COMPLEX, IRREGULAR SHAPES

METAL FORMING AND DRAWING DIES • FORGING DIES • PLASTIC MOLDS
RUBBER MOLDS • DIE CASTING DIES • METAL PATTERNS • CAMS
PROTOTYPE WORK • PRODUCTION MILLING • AND MANY OTHER JOBS

MODERNIZE with PRATT & WHITNEY REPLACE FOR PROFIT

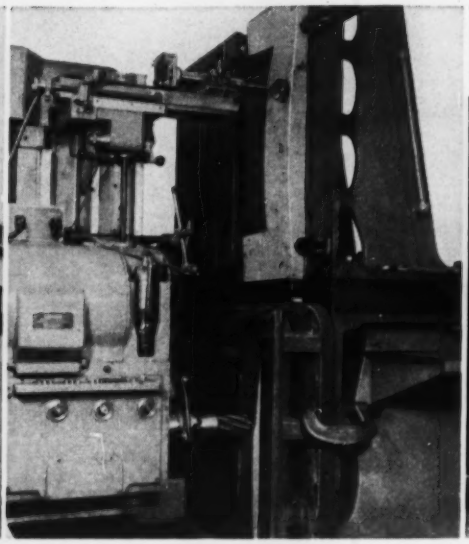
faster and more economically



DIE CASTING DIE . . .

to produce metal shrouds for 25 hp outboard motors. Cavity was deep, intricate, and involved heavy metal removal. Cavity was completely Kellered in only 219 hours on a BG-21 Keller.

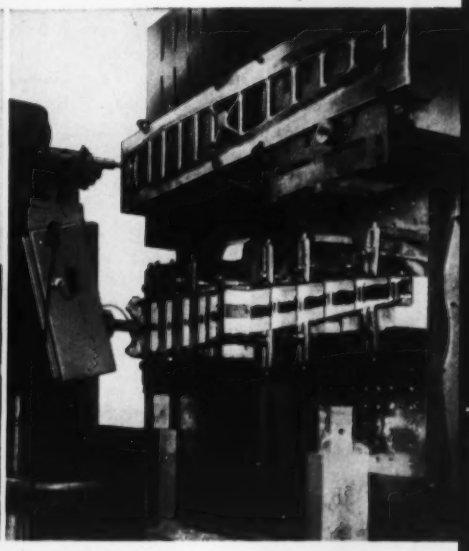
(PHOTO COURTESY ATOLS TOOL AND MOLD CORPORATION, CHICAGO, ILLINOIS)



DRAW DIE . . .

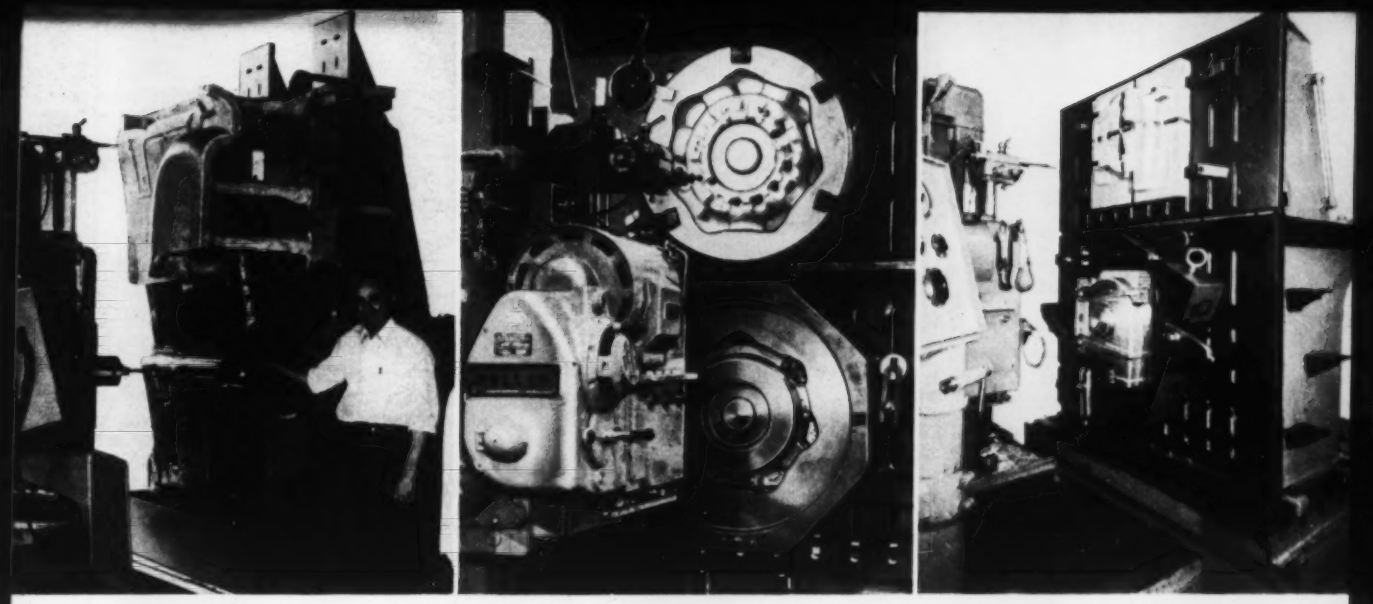
for a motor truck cab door, approximately 48" x 70". The complete job was produced quickly and economically on a Pratt & Whitney Type BG-21 Keller Machine.

(PHOTO COURTESY BUFFALO TOOL & DIE MFG. CO., BUFFALO, N.Y.)



PROFILE MILLING . . .

an aluminum aircraft wing spar is fast and easy with "Kellering." The only template usually required for this type of work is a simple, 2-dimensional template.



BODY FORMING DIE . . .

machined by full 3-dimensional tracer-controlled milling from an intricate plaster model. The finished die will be used to form a complete section for the famous Fisher Bodies.

(PHOTO COURTESY SONITH PATTERN WORKS, INDIANAPOLIS, IND.)

FORGING DIE . . .

Using a cement master cast from a wooden pattern, the Keller BG-21 duplicates the complex cavity in an aircraft engine forging die. "Kellering" accuracy on this type of work greatly reduces hand finishing cost.

IMPRESSION DIE . . .

18" x 24" x 4" to produce covers for an 18" rotary lawn mower (trade name "Lawn Boy"). Working from a plaster model, a Type BG-21 Keller Machine does the job rapidly, accurately.

(PHOTO COURTESY JOHNSON MOTORS DIV., OUTBOARD, MARINE & MFG. CO., WAUKEGAN, ILL.)

with PRATT & WHITNEY TYPE BG-21 KELLER

Automatic Tracer-Controlled Milling MACHINES

OBTAINABLE IN CAPACITIES FROM: 4 FT. HORIZONTAL X 2½ FT. VERTICAL . . . UP TO 10 FT. HORIZONTAL X 4 FT. VERTICAL.

P&W KELLER Machines are powerful, horizontal spindle milling machines with electric tracer control. They reproduce the shape of any 2-dimensional template or 3-dimensional model accurately and economically; total machining time is much less than that required by other methods. Complicated shapes are duplicated as easily and efficiently as simple ones. The initial job is done more economically, and additional duplicates are produced at a fraction of the usual cost and time.

Keller Machines are designed and built *specifically* for tracer-controlled milling . . . not just "adapted" . . . and can take on a wide variety of jobs without requiring major adaptation by costly attachments. They are rugged machines that will operate dependably and accurately year after year without expensive maintenance.

IN ADDITION TO THE NEW TYPE BG-21, LARGER AND SMALLER SIZES OF KELLER MACHINES CAN BE FURNISHED.

WRITE NOW FOR COMPLETE INFORMATION

See how P&W Keller Machines can help reduce machining time and costs and increase your profits. Fill in the attached coupon and mail for your free copy of Circular No. 565 that completely describes the versatile new Type BG-21 Keller.

PRATT & WHITNEY

DIVISION NILES-BEMENT-POND COMPANY

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First Choice P&W *for Accuracy*

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*COMPANY*_____

*CO. ADDRESS*_____

*CITY*_____ *ZONE*_____ *STATE*_____

(*Concluded from page* 113)
relays will be increased substantially, and new models will be added to the line through development or product acquisition.

Builds Tube Mill in Canada

Tubular Products Ltd. is about ready to begin operations at its new 24,000-sq-ft plant in Toronto, Ont. A new electric tube mill with flying cutoff is being installed. Over $300,000 will have been spent on plant and equipment.

GE Completes York Project

General Electric Co., Schenectady, N. Y., officially opened its welding equipment plant in York, Pa. This marks completion of a major expansion of this department. The welding organization began its move from Fitchburg, Mass., early in 1954, occupying the York plant, which formerly was operated by GE's wire and cable department. The latter has relocated in Lowell, Mass., and Bridgeport, Conn.

Widens Titanium Research

Wiesner-Rapp Co. Inc., Buffalo, continuing its postwar diversification program, established a new affiliate, Titanium Products Corp. Titanium Products will do research on the fabrication of titanium and ultimately expects to produce machinery to process the metal.

Power Device Firm Expanding

Eastern Power Devices Ltd., Toronto, Ont., will build a plant on Dixie road, that city. The first building will contain 20,000 sq ft. The present factory contains 80,000 sq ft.

Square D Buys Iowa National

Square D Co., Detroit, acquired Iowa National Mfg. Co., Cedar Rapids, Iowa, and will operate it as a wholly owned subsidiary. As part of the transaction, Square D will take over a 26-acre site on Lincoln highway in the city's southwest section and will complete a 112,000-sq-ft manufacturing plant under construction by Iowa National. C. Howard Brittenham has been appointed manager of the Cedar Rapids plant. Square D, a major producer of electrical distribution and control equipment, announced plans recently to build a new plant at Seacaucus, N. J. It will invest $2.5 million on capital expansion this fiscal year.

Mission Completed

The bottom of this bessemer converter set a new length-of-service record at Jones & Laughlin Steel Corp.'s Aliquippa, Pa., Works. It produced 100 full heats of steel — a total of 2529 tons — before giving out on the 101st heat. The previous J&L record number of heats per bottom was 92

Group To Use Kanigen Process

General American Transportation Corp., Chicago, licensed Societe Europenne de Revetement Chimique of France to use and sublicense its Kanigen nickel plating process in several countries and territories abroad. Purely a chemical process, it handles a variety of shapes and sizes of many base materials. Porosity is low.

Aero To Make Shutoff Valve

Aero Supply Mfg. Co., Corry, Pa., and V. W. Eckel of Northridge, Calif., entered into an agreement under which Aero Supply will manufacture and sell a miniature solenoid-operated shutoff valve. Developed by Mr. Eckel, president of Eckel Valve Co. and Eckel Engineering Co., it's about half the size and weight of most conventional valves.

Equipment Makers To Unite

Gardner-Denver Co., Quincy, Ill., and Keller Tool Co., Grand Haven, Mich., will consolidate, subject to approval by stockholders. Gardner-Denver manufactures pumps, air compressors, rock drills and related equipment; Keller Tool, portable pneumatic tools.

Chemical Firm Widens Interest

Olin Mathieson Chemical Corp., Baltimore, acquired a substantial interest in Hunter Engineering Co., Riverside, Calif. This company is engaged in research and development in the casting, rolling, forging, extrusion and fabrication of aluminum.

Federal Fawick Changes Name

Federal Fawick Corp., Cleveland, manufacturer of brakes and clutches for heavy industrial machinery, changed its name to Fawick Corp. Earlier this year the firm sold its Federal Motor Truck Division.

Helipot Forms Subsidiary

Helipot Corp., South Pasadena, Calif., manufacturer of precision potentiometers, established a subsidiary company with headquarters in Toronto, Ont. Production will include a full range of voltage dividing devices. R. L. Smart is manager of the Canadian plant.

Crucible Opens Warehouse

Crucible Steel Co. of America, Pittsburgh, officially opened its branch sales office and warehouse building at 285 State St., North Haven, Conn. Fred J. Dawless, branch manager, says the warehouse will stock tool, stainless and alloy steels, welding rods, machinery steels and many other specialty products used by the precision metalworking industry of New England. The branch also sells (but does not warehouse) the full line of products of Trent Tube Co., East Troy, Wis., producer of welded stainless steel tube and pipe; the products of Rem-Cru Titanium

FLEXIBLE BUSDROP CABLE

POWERDUCT eliminates expensive rewiring when equipment must be moved.

This cable makes machinery mobile

PLUG IN POWERDUCT at busduct and machine. See how spring keeps cable taut. There is no costly rigid conduit to rip out.

You may not be utilizing the full flexibility of your busduct system . . . if you aren't matching it with equally flexible, UL-approved ANACONDA Powerduct Cable.

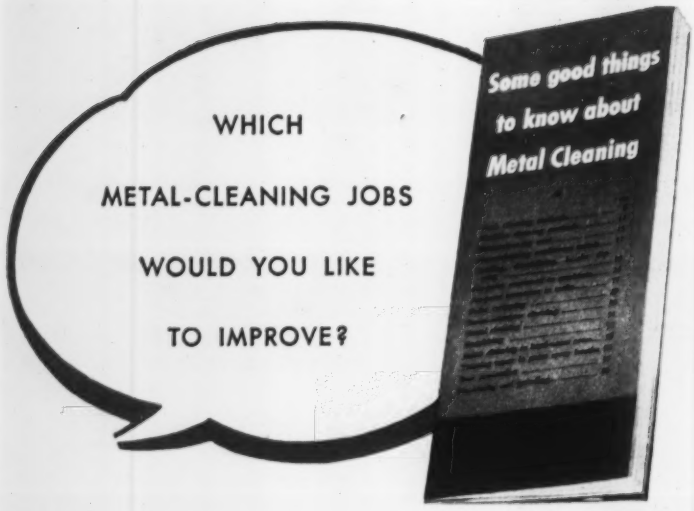
This busdrop cable permits you to quickly relocate machinery. There is none of the expense and bother of ripping out permanent or semi-permanent wiring.

Powerduct is the only nonmetallic-armored busdrop cable approved by Underwriters' Laboratories, Inc. for busway branches under section 3646, 1951 National Electric Code. Always ask for it at your regular supplier. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.* 53119

ANACONDA®

TODAY'S HEADQUARTERS FOR INDUSTRIAL WIRING

Building wire and cable • power and busdrop cables • control and communication wire and cable • distribution cables • magnet wire • wire and cable accessories



Listed below are some of the operations discussed in Oakite's 44-page handsomely illustrated booklet on Metal Cleaning. Please check the list. Then let us show you how Oakite methods can give you better production with greater economy.

Technical Service Representatives in Principal Cities of U. S. and Canada

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS • METHODS • SERVICE

OAKITE PRODUCTS, INC.
34E Rector St., New York 6, N. Y.

Tell me about Oakite methods and materials for the following jobs:

- ☐ Tank cleaning
- ☐ Machine cleaning
- ☐ Electrocleaning
- ☐ Pickling, deoxidizing
- ☐ Pre-paint treatment
- ☐ Zinc phosphate coating
- ☐ Paint stripping
- ☐ Steam-detergent cleaning
- ☐ Barrel cleaning
- ☐ Burnishing
- ☐ Rust prevention
- ☐ ALSO send me a FREE copy of your booklet *"Some good things to know about Metal Cleaning"*.

Name _____

Company _____

Address _____

Corp. Midland, Pa.; and Vacuum Metals Corp., Cambridge, Mass.

At the open house for the new facility the company exhibited what it claims to be the largest bar of high-speed steel ever produced. Manufactured by Crucible, it is 16 in. in diameter, over 10 ft long and weighs over 7000 lb.

Penn Metal Expands Plant

Penn Metal Co. Inc., New York, is enlarging its plant in Parkersburg, W. Va. Additional storage space and improved loading and shipping facilities will be provided for its structural sections.

Arbutus Steel Co. Builds

Arbutus Steel Co. Inc., Arbutus, Md., maker of bar and large span joists, and engaged in general metal fabrication, plans a 5000-sq-ft plant addition. Samuel Pistorio is president.

Thew To Buy Dixie Crane

Thew Shovel Co., Lorain, O. will purchase the controlling stock of Dixie Crane & Shovel Co. Inc., Harrisburg, Pa. The Dixie Crane line will continue to be manufactured and distributed by Dixie Crane, under that brand name.

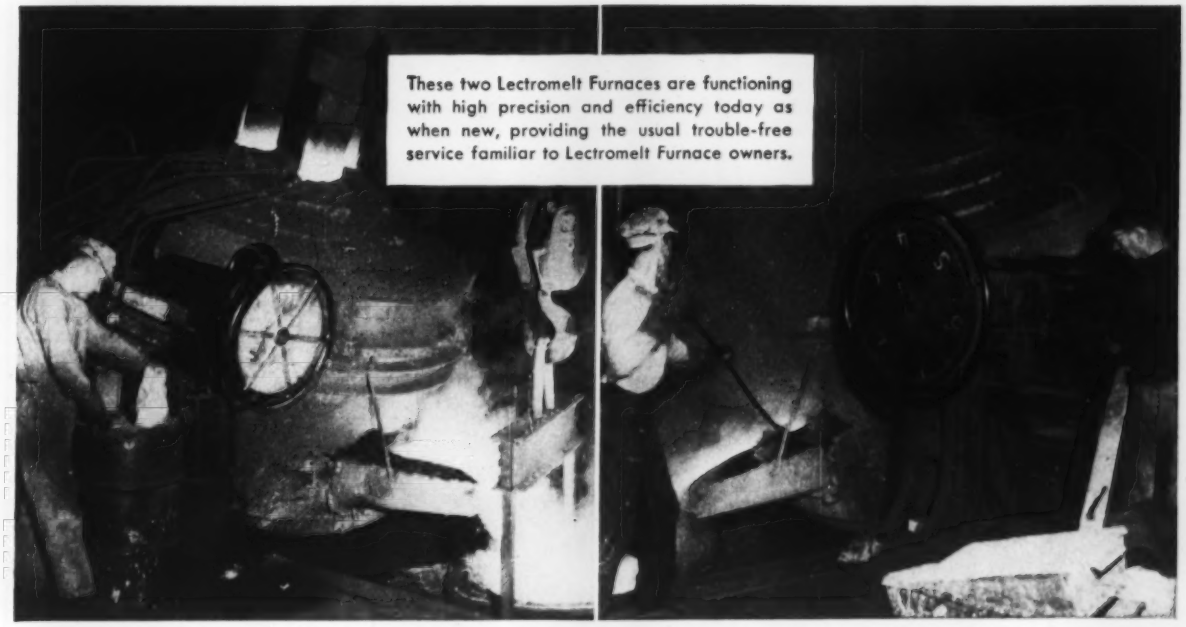
NEW ADDRESSES

Industrial Crane & Hoist Corp., manufacturer of overhead cranes, jib cranes and monorail systems, moved into enlarged office and plant facilities at 1536 S. Paulina St., Chicago 8. The company has more than doubled its manufacturing capacity.

Mathias Klein & Sons, manufacturers of electrician's tools, moved to their new plant and office building at 7200 McCormick Rd., Skokie, Ill.

Taylor Industries Inc., Los Angeles, metal fabricator, moved to a new plant at 9800 E. Rush St., that city.

BG Corp., New York, will move its executive, sales, engineering, purchasing and accounting depart-



These two Lectromelt Furnaces are functioning with high precision and efficiency today as when new, providing the usual trouble-free service familiar to Lectromelt Furnace owners.

MORE THAN 80,000 HEATS SINCE 1918

MORE THAN 35,000 HEATS SINCE 1942

... at Farrell-Cheek Steel Company, Sandusky, Ohio

Thirty-five years of experience, engineering and research, and an understanding of your melting needs go into every Lectromelt* Furnace. Each new idea is proved in actual production at several installations before being applied as part of Lectromelt design.

With more electric furnaces in successful operation throughout the world today than any other manufacturer, Lectromelt engineers qualify to build the most modern, practical electric arc furnaces.

If you are considering purchase of a new electric furnace, be confident that a new Lectromelt Furnace will give you high performance and efficient operation long after your investment is amortized. Ask a long-time operator of Lectromelt Furnaces, like Farrell-Cheek, about the quality of Lectromelt equipment.

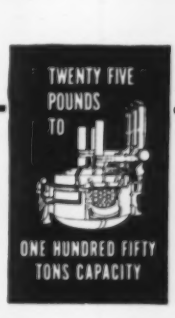
Write for the Lectromelt Furnace Bulletin No. 9. Pittsburgh Lectromelt Furnace Corp., 323 32nd Street, Pittsburgh 30, Pa.

Manufactured in ... GERMANY: Friedrich Kocks GMBH, Dusseldorf ... ENGLAND: Birlec, Ltd., Birmingham ... FRANCE: Stein et Roubaix, Paris ... BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege ... SPAIN: General Electrica Espanola, Bilbao ... ITALY: Forni Stein, Genoa. JAPAN: Daido Steel Co., Ltd., Nagoya

*REG. T. M. U. S. PAT. OFF.

MOORE RAPID

WHEN YOU MELT... *Lectromelt*



MODERNIZE YOUR ROD MILL

for Increased Production... Lower Costs

Birdsboro's advanced engineering developed a new high speed finishing train, coilers and conveyors to modernize an existing mill. The eight stand finishing train is shown above at shop assembly.

If your production is lagging—or you find operating and maintenance costs are top heavy, call on Birdsboro. We are well equipped and have the engineering skill to modernize existing equipment—or replace it with the most up-to-date, efficient steel mill machinery.

Designers and Builders of:
STEEL MILL MACHINERY
HYDRAULIC PRESSES
CRUSHING MACHINERY
SPECIAL MACHINERY
STEEL CASTINGS
Weldments "CAST-WELD" Design
ROLLS: Steel, Alloy Iron, Alloy Steel

MM-21-51-R

BIRDSBORO

BIRDSBORO STEEL FOUNDRY & MACHINE CO., BIRDSBORO, PENNA. Offices in Birdsboro, Pa. and Pittsburgh, Pa.

ments Dec. 1 to 321 Broad Ave., Ridgefield, N. J. Production departments moved to the new location several months ago. The firm makes spark plugs, gas turbine thermocouples, thermocouple harnesses, gas turbine igniters, hermetic seal terminals and special ceramics.

REPRESENTATIVES

Armco Steel Corp., Middletown, O., appointed Cold Metal Products Co. of California, Los Angeles, distributor of its stainless steel sheets, strip and plates. The firm also stocks such carbon steel products as strip steel, annealed spring steel and tempered spring steel. They're produced by Cold Metal Products Co., Youngstown.

McLouth Steel Corp., Detroit, appointed Catalina Steel Co., Huntington Park, Calif., warehouse distributor for its stainless steel sheet and strip for southern California and the Southwest. Catalina Steel is authorized to solicit orders for direct mill shipment.

Rubber & Asbestos Corp., Bloomfield, N. J., appointed Canadian Bronze Powder Works Ltd., Montreal, Que., distributor for its line of industrial adhesives.

Standard Transformer Co., Warren, O., appointed Charles L. Ward Co., Des Moines, Iowa, distributor in Iowa and Nebraska; J. L. Howarth Co., Birmingham, in Alabama and Georgia.

Trabon Engineering Corp., Cleveland, manufacturer of lubrication systems, appointed R. E. Kunz Co., Seattle, as its distributor in Washington and the panhandle of Idaho.

Lindberg Engineering Co.'s Air & Hydraulic Division, Chicago, named Power Drives Inc. as representative for its cylinders and related equipment in western New York state.

Ampco Metal Inc., Milwaukee, appointed O'Neill Pump & Engineering Co., Richmond, Va.; Dixie

(*Please turn to page* 124)

Coming Next Week . . .

Profit Is the Real Yardstick of Design

"Price and appearance may have sold your customer the first time, but *product design* will bring him back . . ."

says DESIGN FOR COMPETITION

The concluding article (No. 10) in STEEL's 1954 Program for Management Series

Reprints of this and other articles in the 1954 Series are available. Here they are:

- *Now You Have To Sell*
- *Build Better Bosses*
- *Automation—How Far Should You Go?*
- *Stabilizing Production, Employment*
- *Integrate Your Distribution*
- *Personnel in Distribution*
- *Transportation in Distribution*
- *Product Diversification*
- *Foremen—Bridge to More Efficiency*

WRITE STEEL 1213 W. THIRD ST., CLEVELAND 13

DUAL METAL

What is "dual metal"? *Depends on what business you're in!*

To twenty of America's largest basic industries with problems of abrasion or corrosion—or both—"Dual Metal" means U. S. Pipe's Special Products Division.

Specifically, "Dual Metal" is our name for centrifugally cast cylindrical sections in which two dissimilar metals are bonded metallurgically by centrifugal force and temperature.

"Dual Metal" centrifugally cast, integrally fused combinations of two dissimilar metals are doing industry's most difficult and exacting jobs better and more economically than ever before.

Design engineers have been quick to recognize the outstanding merits of a process capable of combining the desired mechanical and chemical properties no single metal possesses.

"Dual Metal" means versatility, efficiency and economy.

Research and development play a vital and increasingly important role in the centrifugal casting of "Dual Metal" combinations. Our Pilot Foundry shown above is devoted entirely to process and product improvement.

UNITED STATES PIPE & FOUNDRY CO.

Special Products Division

BURLINGTON, NEW JERSEY

NEW ANSWER TO AN OLD REFINING PROBLEM

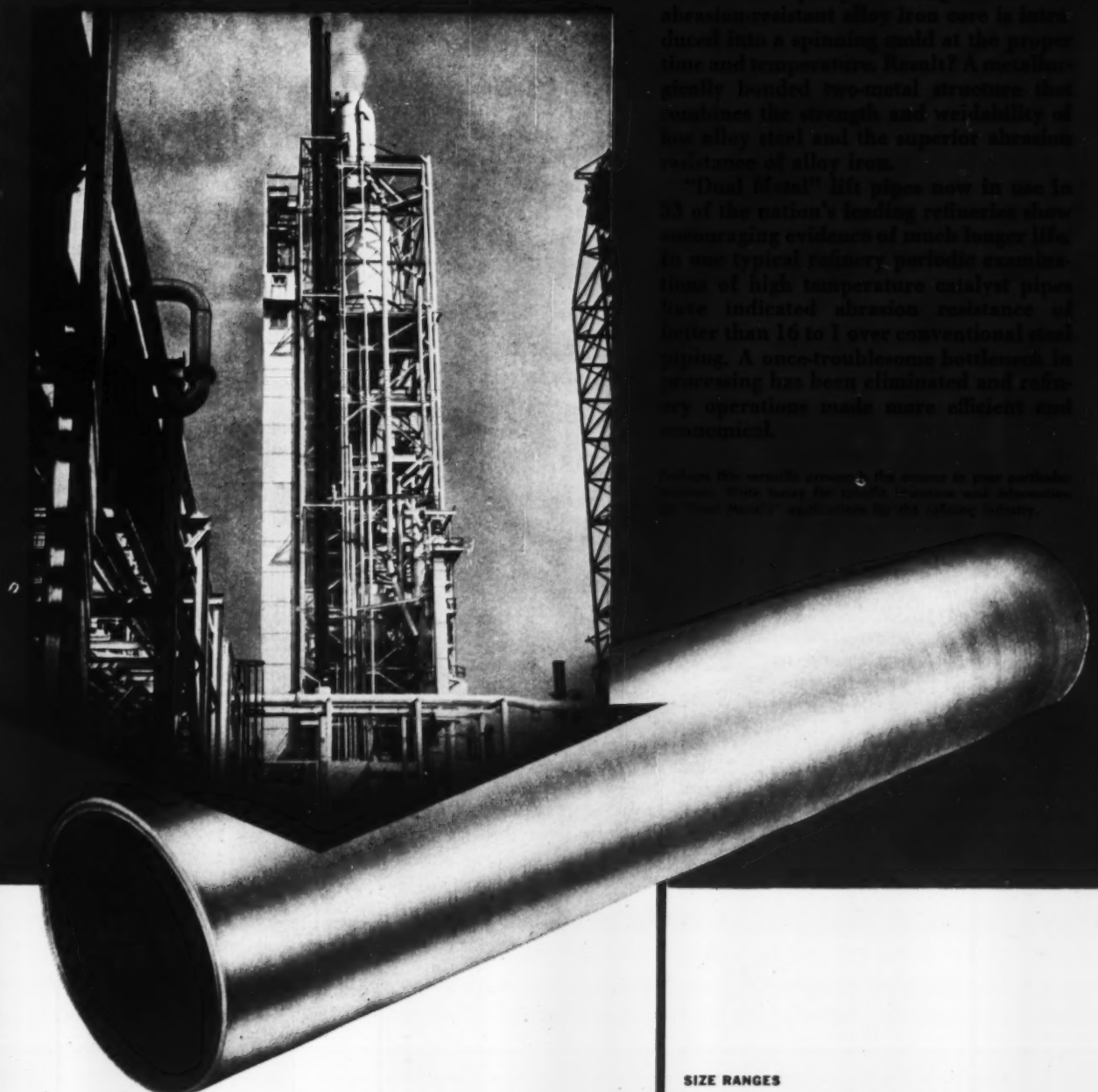
less abrasion...longer wear

"Dual Metal" solves one of the petroleum industry's most severe and costly problems—catalyst erosion of lift pipe and catalyst handling lines.

In making a "Dual Metal" lift pipe the outer shell of weldable alloy steel is poured into a rapidly rotating mold. The abrasion-resistant alloy iron core is introduced into a spinning mold at the proper time and temperature. Result? A metallurgically bonded two-metal structure that combines the strength and weldability of low alloy steel and the superior abrasion resistance of alloy iron.

"Dual Metal" lift pipes now in use in 33 of the nation's leading refineries show encouraging evidence of much longer life. In one typical refinery periodic examinations of high temperature catalyst pipes have indicated abrasion resistance of better than 16 to 1 over conventional steel piping. A once-troublesome bottleneck in processing has been eliminated and refinery operations made more efficient and economical.

Discuss this versatile process in the answer to your particular [illegible]. Write today for [illegible] and information on "Dual Metal" applications for the refining industry.



"DUAL METAL" CENTRIFUGAL CASTINGS

SIZE RANGES

Outside Diameter	6" to 36"
Wall Thickness	½" and up
Length	Up to 14' without welding

Typical Oil Industry Applications: Catalyst Lift Pipe, Depressurizing Pipe, Catalyst Transfer Lines, Slush Pump Liners, Valve Nozzles, etc.

(*Concluded from page* 121)

Bronze Co., Birmingham; American Supply Co., Kilgore, Tex.; and R. C. Foltz Co., Houston, as distributors of its pumps. Ampco also appointed Hart Industrial Supply Co., Oklahoma City, Okla.; Industrial Supply Co., Hazleton, Pa.; and Arcway Equipment Co., Richmond, Va., distributors of its Weldrod products.

Commander Mfg. Co., Chicago, appointed M. N. Thackaberry Inc., Los Angeles, distributor of its precision tools.

Lewis-Shepard Products Inc., Watertown, Mass., appointed two sales and service representatives: Merle Thayer, Davenport, Iowa, and Ray W. Thom, Portland, Oreg. The firm makes materials handling equipment.

Raybestos-Manhattan Inc., Passaic, N. J., appointed Truman E. Longley Co., Cleveland, distributor for its grinding wheel line.

Parker Appliance Co., Cleveland, appointed Persingers Inc., Charleston, W. Va., distributor for its Hoze-lok fittings and hydraulic hose assemblies.

Modern Machinery Sales Co., Erie, Pa., and Moore Bros. Machinery Co. Ltd., Montreal, Que., were appointed distributors by **Reid Bros. Co. Inc.**, Beverly, Mass., manufacturer of precision grinders and machine tools.

National Pneumatic Co. Inc. and its **Holtzer-Cabot Division**, Boston, appointed several distributors for its automatic door operators: Mechanical Equipment Co, Inc., Cleveland; Lyall N. Crissman Co., Pittsburgh; Glenn P. Crissman, Detroit; Dusing & Hunt Inc., Buffalo; Railway & Power Engineering Corp. Ltd., Toronto, Ont.; Barry Hyman Co., Boston; W. W. Bartholomew Co., New York; Ross Builders Supplies, Greenville, S. C.

Carboline Co., St. Louis, manufacturer of corrosion resisting maintenance paints, coatings and linings for industry, appointed Nash-Pittsburgh Co., Pittsburgh, as its representative in that territory.

ASSOCIATIONS

Foundry Equipment Manufacturers Association, Washington, elected W. B. Wallis, Pittsburgh Lectromelt Furnace Corp., Pittsburgh, president; D. E. Davidson, Link-Belt Co., Chicago, vice president; C. R. Heller, executive secretary-treasurer.

American Welding Society, New York, elected Joseph H. Humberstone president; J. J. Chyle, A. O. Smith Corp., Milwaukee, first vice president; C. P. Sander, Consolidated Western Steel Division, United States Steel Corp., Pittsburgh, second vice president. Mr. Humberstone is president of Air Reduction Sales Co. Inc., New York.

J. H. HUMBERSTONE
. . . pres., Amer. Welding Society

Outstanding achievements in welding were acknowledged with the presentation of awards during the society's fall meeting in Chicago. Prof. A. A. Toprac, University of Texas, was presented the Lincoln Gold Medal for the paper, "An Investigation of Welded Rigid Connections for Portal Frames," published in the *Welding Journal*. The medal is sponsored by J. F. Lincoln, president, Lincoln Electric Co., Cleveland.

A. F. Davis, vice president and secretary, Lincoln Electric Co., was awarded the Samuel Wylie Miller Memorial Medal. It is made annually for meritorious achievement that has contributed conspicuously to the advancement of the art of welding and cutting.

H. O. Hill, assistant chief engineer, fabricated steel construction, Bethlehem Steel Co., Bethlehem, Pa., was elected an honorary member of the society in recognition of his pioneering work in the application of welding to steel structures.

Anti-Friction Bearing Distributors Association, New York, elected George Rees president, succeeding R. J. Moore, Detroit Ball Bearing Co., Detroit. Mr. Rees is president of Syracuse Bearing Co., Syracuse, N. Y. Other officers are: Joseph Moore, Detroit Ball Bearing Co., vice president; Robert E. Neiman, Southern Bearings Service, Memphis, Tenn., treasurer.

Union Miniere du Haut Katanga, Belgian mining concern which operates the Shinkelobwe uranium mine in the Belgian Congo, becomes the first company outside of the United States to join **Atomic Industrial Forum Inc.**, New York. It's an industrial association to advance the peacetime development of atomic energy. Walker L. Cisler, president of Detroit Edison Co., is president.

Instrument Society of America, Pittsburgh, elected W. H. Brand, Conoflow Corp., Philadelphia, president. Other officers are: A. A. Anderson and W. H. Fortney, vice presidents; J. T. Vollbrecht, treasurer.

John A. Warren, formerly packaging consultant for American Home Products Corp., New York, joined the staff of **American Management Association**, that city, as technical adviser to the AMA Packaging Division. The association plans to expand and accelerate its educational program for packaging management.

Service Tools Institute, New York, elected J. C. Malugen president. Mr. Malugen is president of J. H. Williams & Co., Buffalo, manufacturer of wrenches, tools and drop forgings.

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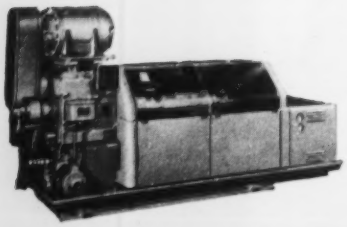
High quality stainless sheet and strip steel . . . for the product you make today and the product you plan for tomorrow.

McLouth Steel Corporation
DETROIT, MICHIGAN
Manufacturers of Stainless and Carbon Steels



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Jones & Lamson now offers a choice of ways whereby you can acquire new machine tools . . . on terms best suited to your own needs. In addition to outright purchase, with its obvious advantages, we offer a "Pay-from-Productivity" plan, on a 1-to-5 year basis, at interest rates as low as 3¼%*. This plan is designed for companies that prefer to finance modern machine tools out of the actual additional earnings these tools produce. Also, a lease plan — in 4 optional forms — for companies that lack the full cash purchase price, or have more pressing uses for their capital.

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JONES & LAMSON MACHINE CO.
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UNIVERSAL TURRET LATHES • FAY AUTOMATIC LATHES • AUTOMATIC DOUBLE-END MILLING & CENTERING MACHINES
AUTOMATIC THREAD & FORM GRINDERS • OPTICAL COMPARATORS • AUTOMATIC OPENING THREADING DIES & CHASERS

Technical Outlook

NEW TUBING—At the recent Metal Show Olin Mathieson Chemical Corp. displayed products made by a new method of roll bonding. Technique makes it possible to create any pattern of tubing within a sheet of aluminum, brass, stainless or carbon steel. Real avenue of cost reduction with the new product lies in radical design changes the new product makes possible.

INSIDE THE FURNACE—Visitors at the Metal Show were taken inside a 4-ft diameter vacuum furnace to watch melting and casting of high purity metal. F. J. Stokes Machine Co. did it with RCA closed circuit television. The camera, trained on the interior of the chamber through one of the 6 in. sight glasses transmitted details of the operation to a monitor screen in the Stokes booth.

NEW DIE STEEL—Also, at the Metal Show was a new die steel developed to deep draw and form stainless steel. It contains 12 per cent vanadium, 1 chromium, 3.25 carbon and 1 molybdenum. Allegheny Ludlum says it performs without galling or pickup and has outstanding wear resistance.

LOTS OF CHANGES—The average auto shopper won't notice it, but the completely new body design in the 1955 Ford car necessitated changing 570 major welding fixtures. Multiply these by the number of assembly plants all over the country and you get some idea of the headaches born of model changes.

OXYGEN STEEL—Dominion Foundries and Steel Ltd., Hamilton, Ontario, is operating its oxygen steelmaking plant, the first one outside Austria where the process was born. (STEEL, July 19, p. 110) They're making about 1000 ingot tons daily. Company metallurgists report the steel is more ductile and easier to form. While no cost details were released, the company admitted that the open hearth fuel savings will more than offset the oxygen costs. Process is considerably faster than open hearth steelmaking, too.

INVESTMENT CASTING LIMITS—Producers of precision investment castings are taking a realistic attitude toward the dimensional tolerances claimed for their products. This was brought out at the recent second annual meeting of the Investment Casting Institute in Chicago. Discussing dimensional control, E. G. Chapman, Misco Precision Casting Co., Detroit, suggested these limits for various section thicknesses: Under ¼-in., ±0.003; ¼ to ½-in., ±0.004; ½ to 1 in., ±0.005; each additional 1 in., ±0.005.

STANDARDS—After 7 years of work the Steel Shipping Container Institute has issued recommended standards for steel drums and pails.

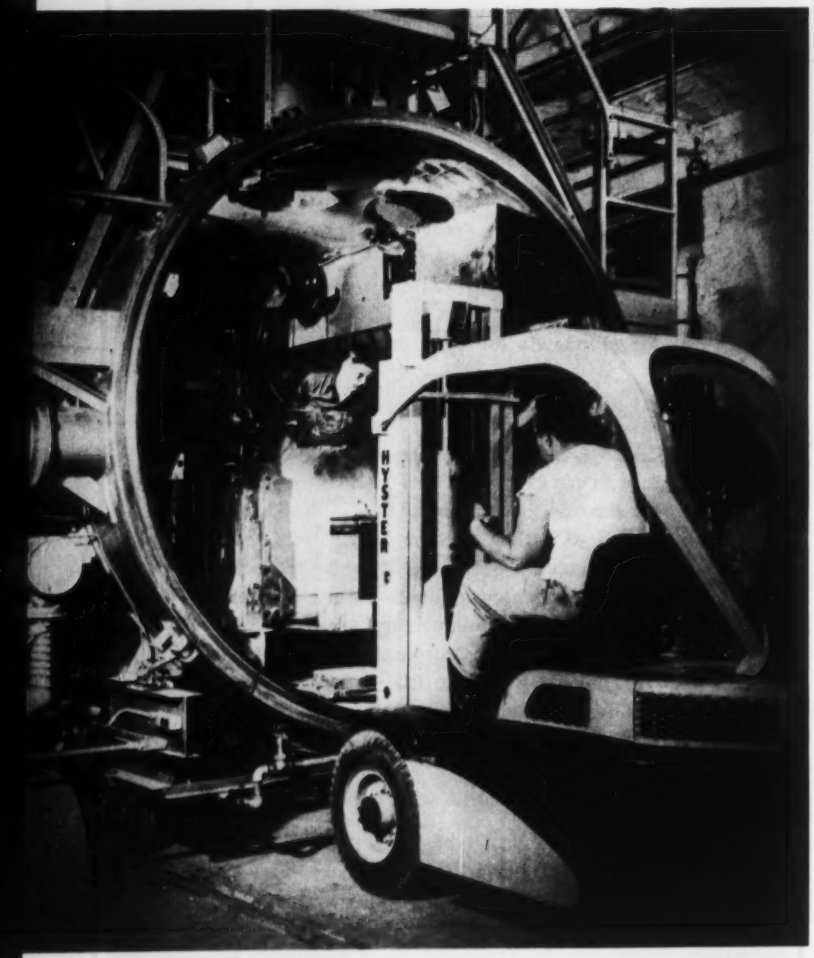
SILICATE COATING—A new line of low temperature firing (900 to 1200 F) silicate coatings gives glass-like protection to steel. Finish may be applied at either mill or fabrication levels and is particularly adaptable to tanks and tubular products. Other applications are in architectural, electrical, appliance and transportation industries. Known as Porcenells, the coatings were developed by Vitreco Inc., a research company jointly owned by Poor & Co., Chicago, and Youngstown Sheet & Tube Co., Youngstown, O.

CHEAPER SILICON—Du Pont has lopped $50 per pound off the cost of high-purity silicon, reflecting growing demand for this semiconductor by the electronics industry. It still costs almost as much as gold, though.

A 1000 lb capacity vacuum furnace—largest ever built for melting and centrifugally casting high temperature alloys—has gone into operation at Utica Drop Forge & Tool Co., Utica, N. Y. Designed and built by F. J. Stokes Machine Co., Philadelphia, it will carry out all heating, melting, alloying and casting operations within the vacuum chamber. Although rated at 1000 lb, chances are good it can handle close to 2000 lb when everything gets going. Induction heating unit was built by Tocco in Cleveland

This 500 lb ingot of Waspaloy was cast from the third heat melted in the 1000 lb Stokes vacuum furnace at Utica Drop Forge & Tool Co. The ingot texture is extremely fine. At the left can be seen hot top with part of asbestos cloth sticking to the metal

By DR. ALLEN G. GRAY
Technical Editor



Coil assembly and crucible for 1000 lb furnace are removed with lift truck. Operator behind furnace has just disconnected water lines and tilting cables. To remove furnace assembly from vacuum shell requires only 10 bolts

Vacuum Melting Goes Commercial

THERE'S NO doubt about it. Vacuum metallurgy is causing a major stir in the specialty metals industry.

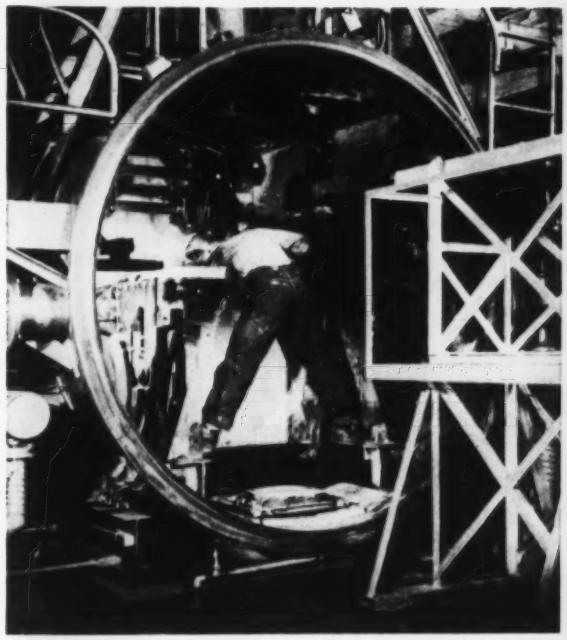
"It's the apple of the metal industry's eye," James D. Nesbit of Universal Cyclops Steel Corp., a specialty maker, told the Electrochemical Society at a recent symposium on vacuum metallurgy in Boston.

Look at the evidence: The metal is cleaner in the metallurgical sense. Its inclusion count is so low that ball bearings, for example, have a much longer fatigue life.

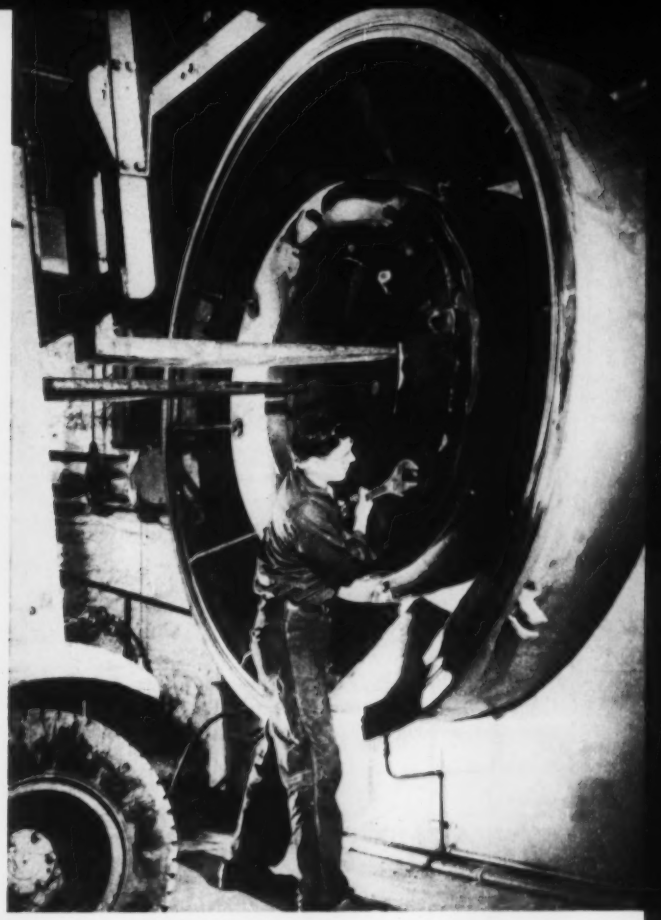
Vacuum gives better stress rupture characteristics and higher ductility. Hot working and mechanical properties are better.

Different — Conventional steel melting uses slag and fluxes to react with and insulate molten metal from the atmosphere. These help tie up oxygen, nitrogen, sulphur and other impurities in less undesirable forms in the finished metal. But this degree of control is unsatisfactory for many high alloy steels.

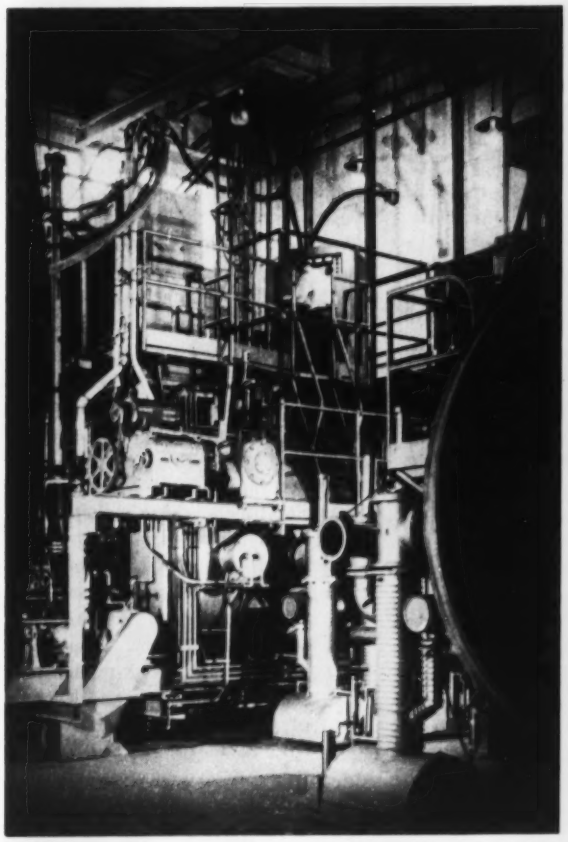
Vacuum or an inert system also



Utica operator is patching crucible in centrifugal casting vacuum furnace. Bottom stool of a 500 lb ingot mold is in front part of furnace directly in front of pour point. Stool sits on a water cooled flat

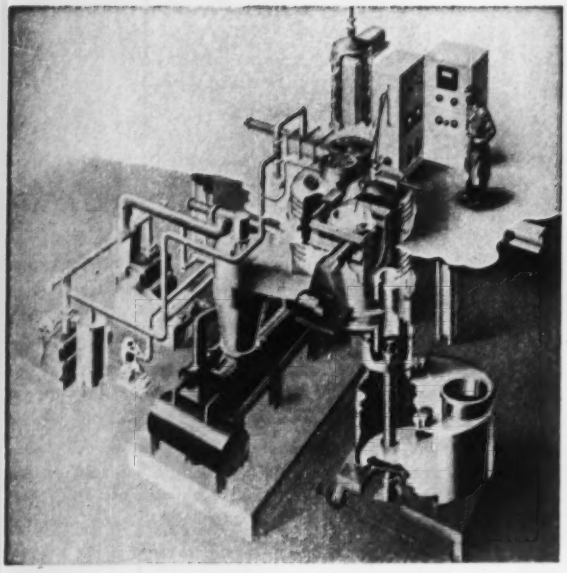


Centrifugal casting mold is disassembled. Mold makes a centrifugally cast ring 48 in. OD x 43 in. ID x 5 in. long. The forged steel mold weighs about 8000 lb. Discoloration is from condensation from a previous melt. Hyster fork truck handles mold rings during disassembly

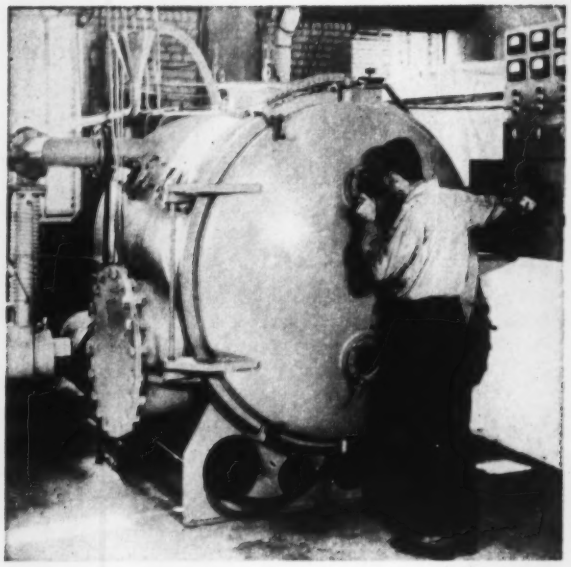


Operator is taking readings from Tocco control panel for induction heating the charge. Power and water leads to the furnace are flexible

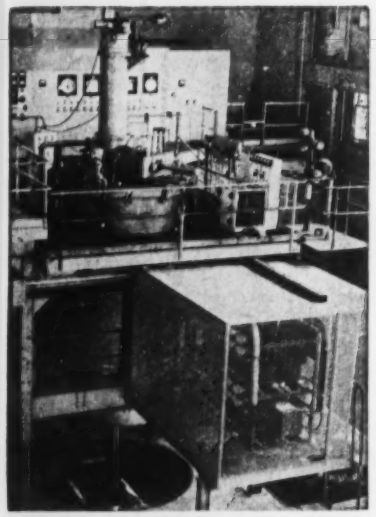
Addition mechanism and vibrator feeder for vacuum furnace. Cobalt slugs are dropped from one of the buckets of the additions mechanism into the vibrating feeder that carries them over into the crucible



Layout of 1000 lb vacuum furnace to be installed at Carboloy Dept., General Electric Co., Detroit by Consolidated Vacuum Corp. Unit operates semi-continuously



Arc melting furnace that can pour 50 lb titanium per charge at National Research Corp. It is used to produce large titanium castings or several small parts at once



1000 lb vacuum melting furnace at Universal Cyclops Steel Corp., fabricated by F. J. Stokes Machine Co. Furnace has six 1000 lb molds on turntable. Vacuum is held until all molds are filled. Induction heating system was built by Ajax Electrothermic Corp., Trenton, N. J.

opens the way to melt alloy steels and other iron based alloys containing highly reactive elements, such as titanium, aluminum and zirconium. Control of analysis is better. Nonuniformity of properties and changes from melt to melt disappear.

Reactivity of titanium with oxygen and nitrogen in the atmosphere makes conventional air melting of high temperature alloy M-252 a borderline proposition and pegs it as a job for vacuum.

Payoff — Another factor that magnifies the vacuum dollar mark is better yield, particularly in scrap recovery of high alloy materials. When the process is compared with air melting, some producers think they may pick up as much as a 50 cents per lb differential.

One large supplier of high alloy materials of the Hastelloy-type says recovery of elements in scrap using vacuum is as high as 95 per cent—experimental scale. With 500-lb melts it is better than 90 per cent.

Reasons—Considerations such as these are reasons why research director Nesbit is working with vacuum to improve Universal-Cyclops' specialties—super alloys, toolsteels and stainless.

Other companies are working or at least looking in the same direction.

Utica Drop Forge & Tool Co., Utica, N. Y. is operating a 1000-lb furnace (see photos) for melting and centrifugally casting high temperature alloys and is installing a second furnace of same capacity.

Others — Specialty steelmaker, Crucible Steel Co. of America joined with National Research Corp. to develop production at Vacuum Metals Corp., now a jointly owned subsidiary. A 2000-lb vacuum furnace is being installed at Crucible's Syracuse, N. Y. plant.

Carboloy Dept., General Electric Co., Detroit, is making a new high temperature alloy by vacuum melting. Westinghouse says it will install a 1000-lb furnace at its Blairsville, Pa., plant next year.

Start—At the Electrochemical Society's vacuum metallurgy symposium, Nesbit, in pinpointing the value of vacuum methods, credited induction vacuum furnaces with taking the first step toward higher purity by excluding melting evils associated with natural conditions —air and atmospheric pressure. The refining process creates volatile oxides, such as water vapor and carbon monoxide. They can be pumped away, which means that the need for the slag on the surface of the melt is eliminated.

Purity is better by at least a factor of ten over the regular electric furnace. Volatile impurities are minimized. Highly reactive alloying elements can be used up to the limits set by the metal-crucible reaction.

Interior of vacuum melting furnace at General Electric Research Laboratory. Chain (left) tilts furnace by remote control while it is still in vacuum

Revived—In induction vacuum melting, the crucible is the chief source of impurities. Properties of reactive metals like titanium are sensitive to small quantities of oxygen, nitrogen, hydrogen and carbon with which it readily combines.

The cold crucible vacuum arc furnace, used in the laboratory for a long time, has been scaled up for the production melting of reactive and high melting point metals.

Purity achieved is better by at least a factor of 10 over induction vacuum and by a factor of 100 or more over the regular electric furnace. This difference for reactive elements, such as titanium, zirconium or molybdenum, is the difference between a readily forgeable ductile product and brittle impure metal cinders.

Levitation Melting—Still in laboratory stage this process suspends molten metal in a magnetic field in a vacuum system. Metallurgists say that once the problems are solved for commercial use levitation will see rapid growth.

It is the ideal process for containing, stirring and refining molten metals without contact with reactive elements other than those needed for the chemical refining reactions.

Zone Melting—According to Nesbitt, this is fast becoming a commercial process for making germanium and silicon for electronic applications. Purity needed is beyond normal analytical limits.

You hear talk of purities of less than one part in 10 million, achieved by taking advantage of the greater solubility of impurities in the liquid over the solid phase. In a series of operations impurities are reduced to a lower and lower level. Impurities of a few parts per million control the properties of semiconductors.

Growing—Vacuum arc melting rates of 25 to 30 lb per minute are common in commercial installations. Ingots up to 24 in. in diameter are produced. These were points brought out at the Electrochemical meeting by P. C. Rossin, General Electric Co.

Definition—Melting occurs in a water cooled metallic mold through use of a high current ac or dc arc. The melting chamber is enclosed; inert gases or vacuum are used to reduce the partial pressure of contaminant gases.

Two distinct processes exist: The inert or nonconsumable electrode and the consumable electrode. According to Rossin, here are the basic differences:

The inert electrode furnace uses a water cooled electrode tipped with graphite or tungsten. Metal is fed into the mold by an auxiliary device and melted by the thermal energy of the arc.

Electrode Melts—The consumable electrode process used a preformed or continuously formed electrode of the charge material. The ingot is formed by direct transfer of electrode material in superheated form to the molten bath. This method has certain advantages: 1. High thermal efficiency. 2. Elimination of tip material contamination. 3. Freedom of operation in high vacuum.

HOW MUCH DOES VACUUM MELTING COST?

Note: Figures are based on a 1000 lb induction furnace producing 2 million lb metal a year.

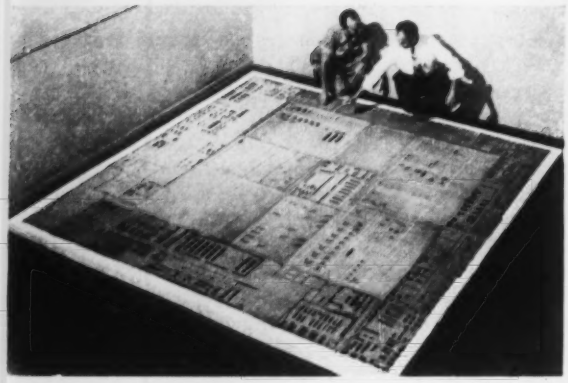
	Atmospheric Furnace	Vacuum Furnace
Labor	$0.009 lb	$0.015 lb
Power	0.010	0.015
Depreciation	0.012	0.030
Overhead	0.031	0.060
	Total: 0.062	Total: 0.120

There seems to be the feeling among some that vacuum melting is in the dollar rather than cents per pound range. This may be true with small experimental furnaces. High overhead and a lot of extra testing on melts can run costs up. Vacuum melting on a bigger scale is another question.

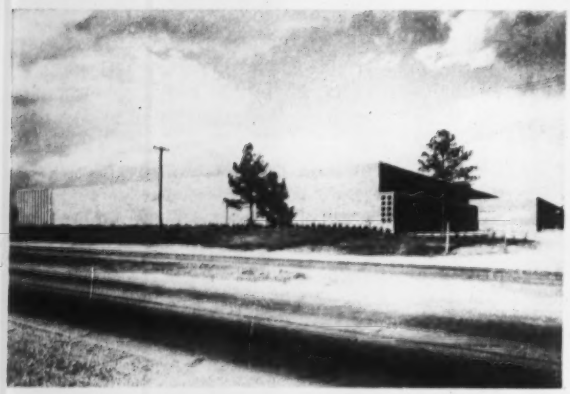
Figures given in the table were calculated by G. J. Crites, F. J. Stokes Machine Co. He presented them at the Electrochemical Society's Vacuum metallurgy symposium to show that commercial vacuum processing costs about twice as much as atmospheric melting. It is assumed that the operations compared are on the same scale.

Here are the background factors:

1. Output—Eight heats per day from the 1000 lb (300kw) units giving 2 million lb of metal per year.
2. Labor—Atmospheric furnace: Six men for 8 hours each. Vacuum: Ten men for 8 hours each. Rate used for calculation was $1.50 per hour.
3. Power—Atmospheric furnace: Two lb metal are melted per kwh at 2 cents per kwh. Since about half the melting power requirements are supplied as vacuum pump power for heaters and motors on the pumps, cost per pound for power for metal melted in vacuum is increased by 50 per cent.
4. Amortization—This was included as a basic cost because of the difference in original cost of the two types of equipment. Atmospheric furnace was assumed to cost $120,000. Vacuum was set at $300,000. Both costs were amortized over 5 years.
5. Overhead—a 100 per cent factor was used for both atmosphere and vacuum systems.



Fire protection begins with planning



Windowless construction brings new fire problems

Wide open spaces. Nothing to slow fire here

Recognizing the hazards is half the battle

The New

Fire is diabolical. It turns new construction, new materials, new processes to its ends. Smart planning can lick it before it starts

WHEN MODERN METALWORKING CO. moved from its heart-of-the-city firetrap into a new one-story suburban plant you could feel the relief. Fire worries were over.

Only they weren't. Modern Metalworking was only trading old obvious fire hazards for new hidden ones. Fortunately, management caught on in time or the situation could have been serious.

Old Order Changeth—In the old plant, work areas had been chopped up by walls and floors—barriers that would temporarily confine a fire to where it started. But the new plant was one vast room. A fire anywhere potentially involved the whole plant at once. Modern installed fire drop-curtains and walled off its most dangerous areas in a hurry.

Steam, water, air lines were overhead in the truss area—where a heat-buckled truss would pull them down. Modern installed fire mains under the floor.

The new plant was windowless and air conditioned. Into the roof went special vents to draw off a fire's heat and smoke. More fire escape doors were put in.

Fire Conveyors—Plant-wide conveyors and air conditioning ducts were recognized as potential avenues of rapid fire advance. Plans were made to block them off at intervals.

The suburban fire department turned out to be neither so well trained nor so well equipped as the city firemen. Modern had to train its own fire brigade and buy a small pump and hose truck that could maneuver in the plant aisles. The water supply was adequate—unless there was a drought. Modern, taking no chances, put in a big standpipe. Fortunately, the

Livonia was a lesson . . .

Burns Too

sprinkler system was already in, ready for action.

About that time someone realized that the re-arrangement of the plant had created new fire relationships between each piece of equipment. For instance, flaming hydraulic fluid from a broken line on a press might ignite cutting oil on machinery formerly located on another floor. Modern redistributed its first-aid extinguishing equipment.

The Facts—For companies like Modern, wide publicity and expert information about fire hazards combine to stop most fires before they start. What knowledge hasn't stopped is the frightening rise in the cost of industrial fires that do gain a foothold.

Fire Hazards and Safeguards for Metalworking Industries, a recent publication of the National Board of Fire Underwriters, points out that fire damage over $250,000 to metalworking plants during the period 1942-1953 was 17 times greater than fire damage of the same level from 1931 to 1942. There were 175 large-loss fires in the latter period and only 18 in the earlier.

Wide-Open — Current preference for the single-story plant with huge wide-open areas has contributed to rather than diminished the fire problem. Rural areas often have inadequate fire departments and haphazard building codes. Higher production speeds, temperatures and pressures introduce new risks. Each new material adds a new fire problem.

That's why on-their-toes planners keep fire prevention constantly in mind. They make it an integral part of planning—not afterthought. Here are some of the things they look for in their planning:

CHECK YOUR FIRE POTENTIAL

Working areas: Are they larger than necessary? Hose range is about 60 ft.

Construction: Will roofs resist fire from inside? Will floors burn? Will structural members fail in intense heat?

Utilities: Are they placed where fire can't knock them out?

Windowless areas: Do they have emergency vents to remove heat and smoke?

Aisles: Are they wide enough for fire trucks?

Overhead conveyors: Can they be reached by fire extinguishing equipment?

Combustibles: Where are they concentrated within the plant? Is there a way to get rid of them quickly in case of fire?

Machinery: Will fire at one machine involve others immediately?

New Materials: Are their fire potentials known? Will they ignite spontaneously? React violently with chemicals used in the plant? Explode when heated?

New processes: What hazards do they involve? Are they considered before the process is installed?

Fire barriers: Have they self-closing doors?

Alarm and sprinkler systems: Are they properly maintained? Often checked?

Fire fighting equipment: Adequate? In the right places? Well maintained?

Water supply: Is it adequate to fight fire?

Fire department: How good is it? Do you need your own?

Employees: Do they all know what to do in case of fire?

Fire Likes These
ARE YOU ON GUARD?

Oil fogs as cooling and lubricating media in machine tool operations.
High speed machining with its increase of hot metal chips.
Combustible metals such as titanium, zirconium, magnesium.
Molten sodium as a cooling medium.
Hydraulic equipment in hot processes.
Metal powders and dusts.
Controlled atmosphere heat treating.
Hot paint spraying.
Flammable solvents, adhesives, plastics.
Oxygen and other compressed fuel gases.
Salt baths.
People who ignore your hazards.

European installation of 3 Brown Boveri low-frequency induction melting and 12 resistance heated holding furnaces each serving a casting machine. Melting furnaces are located in front of control panel (see close-up)

Melting Magnesium at 60 Cycles

LOW FREQUENCY induction heating has gained a foothold in magnesium melting. Big appeals are high melting capacity and low melting loss of less than 1.5 per cent with new metal.

Some 20 installations have been put into operation in the last ten years, says Brown Boveri Corp., New York, designer and builder of tilting type furnaces. While most of them are in Europe, a 60-cycle coreless induction melting furnace has been operating in the Midwest nearly a year.

Technique—In indirect inductive melting, energy is concentrated inductively in a massive magnetic steel crucible. Heat is transferred to the magnesium charge chiefly by conduction. This affords high power concentration, rapid heat transfer, uniformity of heat distribution and positive control over agitation of the pour.

Eddy currents are created within the crucible, their electromagnetic forces directed toward the axis of the crucible. Impurities having high resistivity concentrate on the periphery and are deposited on the crucible's walls.

Temperature of the bath is held constant by automatic switching of upper and lower phases of the induction coil. Furnace input is regulated without a regulating transformer. As magnesium is always melted under a protective layer of salts or flux, adapting the height of the coil to depth of the bath regulates convexity of the liquid metal surface and damps stirring action within the melt.

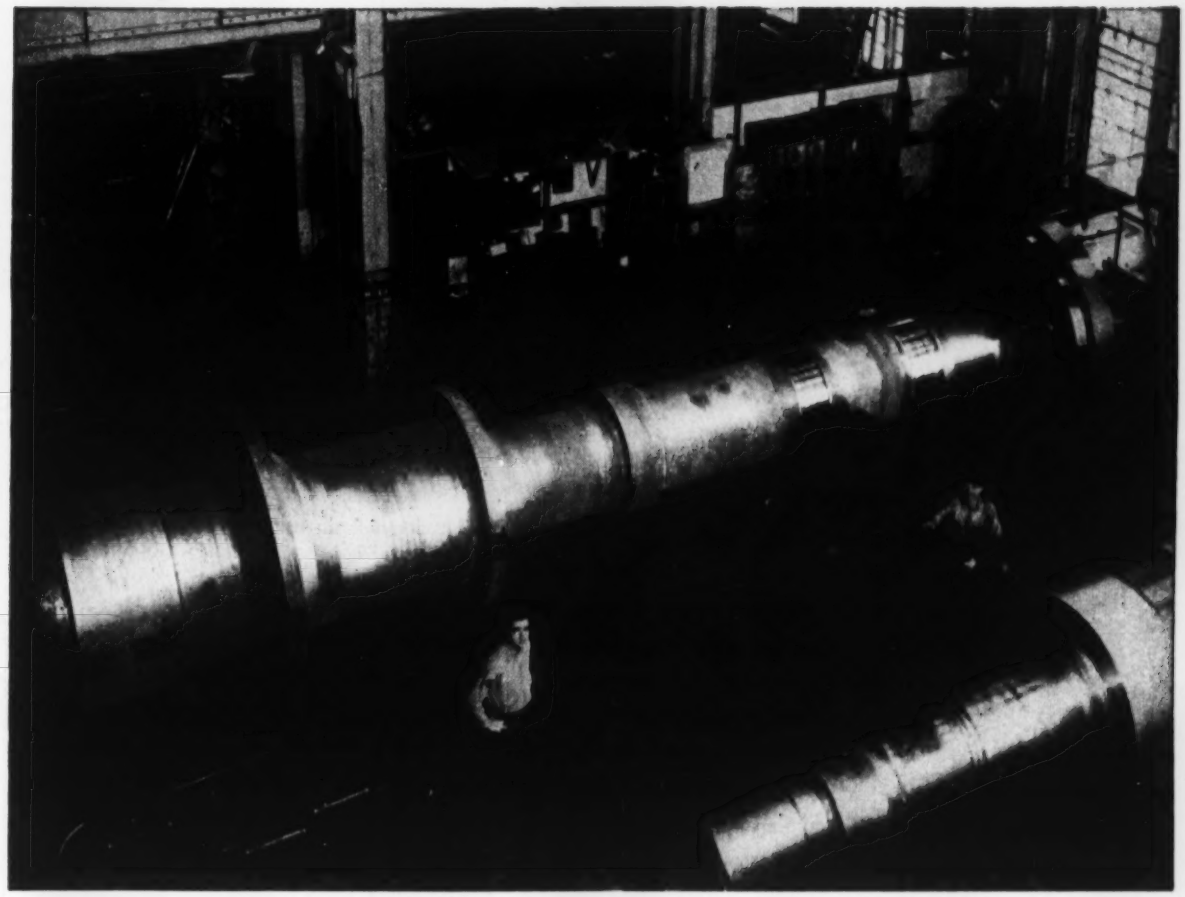
Energy consumption in continuous operation is somewhat higher than with submerged resistor furnaces. This is offset by the low cost of changing the crucible (it can be done with little interruption of production) and long life of the crucible lining. Average life expectancy of the crucible is 1000 charges.

Advantages cited by Brown Boveri's John C. Trackman include low melt loss which increases yield of net castings per pound of metal; uniformity of results; minimum dust, noise and fire hazards; negligible heat radiation and automatic temperature control and distribution. A public utility survey indicates operational savings in one year of about 100 per cent are possible.

Results — In one installation, a large magnesium foundry using four 450-kw furnaces with individual crucible holding capacity of 1300 lb, each furnace handles 880 lb in 25 minutes.

In a plant producing magnesium extrusions for the auto industry, acceptance tests showed a 1240-lb charge of magnesium without slag reached 720 C in 56 minutes, starting with a cold furnace, with total power consumption of 225 kwh or 0.183 kwh per pound. A second charge with 187 lb of slag and 1163 lb of magnesium was melted and superheated to the same temperature in 38 minutes, yielding a specific energy consumption of 0.175 kwh per pound. The plant produces 370,000 lb of magnesium per crucible each month. At crucible life of 1000 charges and an average of 1050 lb of magnesium per charge, yield is 1,050,000 lb of magnesium per crucible.

"Magnesium in Use" is the theme of the Tenth Annual Meeting of the Magnesium Association being held this week in St. Louis. Watch for STEEL's coverage of this meeting for up-to-date information on casting, fabrication, finishing and application—in the issue of Dec. 6



THE TURNING POINT *for a Stronger Forging*

Product —
Hydro-electric Power Shaft

Overall Length —
34′ 8½″

Body Diameter —
38½″

Flange Diameter —
96½″

Bore Diameter —
17″

. . . is not the machining of this 96-ton generator shaft, but the number of intricate forging operations performed by Midvale craftsmen. The 116″ octagon ingot, poured at Midvale for this shaft, required a 14,000-ton press to exert tremendous pressures to upset and draw it out for full strength and toughness . . . especially the large thrust collar which is 96½″ in diameter. Then after it was carefully worked to a rough shape it was put in this 100″ lathe for machining and boring.

The same skill, care and proved-practices are used by Midvale forgers in making all Midvale forgings for steam turbine shafts, generator rotors, marine reduction gears, pinions and other heavy machinery parts. Quality tests confirm this skill and experience of Midvale steelmakers every step of the way from the furnace to finishing operation.

Have your engineers and designers specify Midvale forgings engineered and made for maximum service. Whether 300 or 300,000 pounds they are noted for their toughness, long service and never-failing performance. Write, wire or phone your forging problems to us. Midvale engineers are always at your service.

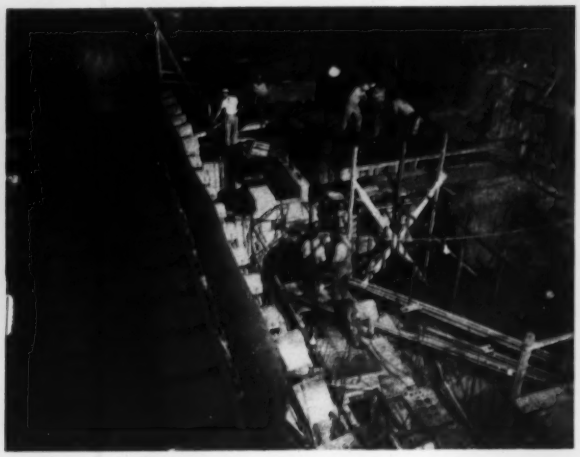
THE MIDVALE COMPANY- Nicetown, Philadelphia 40, Pa.

Offices: New York, Chicago, Pittsburgh, Washington, Cleveland, San Francisco

MIDVALE

FORGINGS, ROLLS, RINGS, CORROSION AND HEAT RESISTING CASTINGS

First came carefully-scheduled demolition . . .



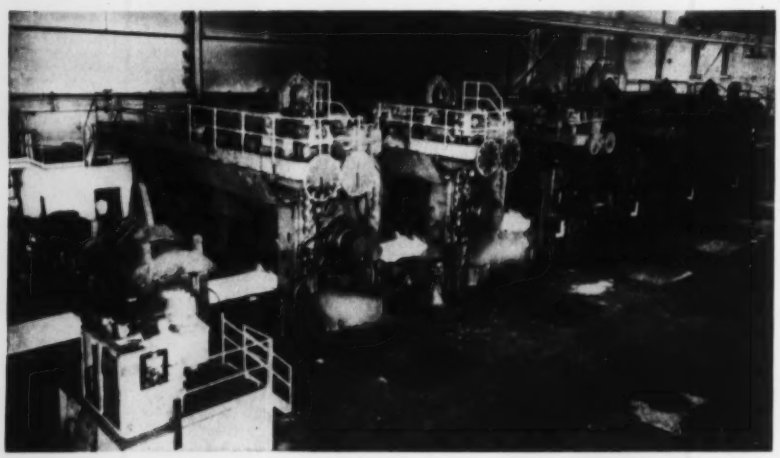
While mill continued to roll, construction commenced

Mill Expansion With Few Production Tieups

That's what Kaiser Steel wanted when adding two new stands to its 86-in. hot mill at Fontana. They achieved it with only 16 days of lost production

FIRST estimates of how much time it would take Kaiser Engineers to install two more stands to the 86-inch hot mill at Fontana, Calif., added up to 51 days of downtime. "Too much lost production," said the mill. "You'll have to do better."

With careful planning and execution, they did do better than that . . . the entire job was completed with only 16 days of lost production over a period of almost six months. Alterations included installation of stands 5 and 6, relocation of table rollers for lighter gage material, a crop pit with catching device, new down coiler and electrical equipment—that plus roll cooling and spray pumps and motors.

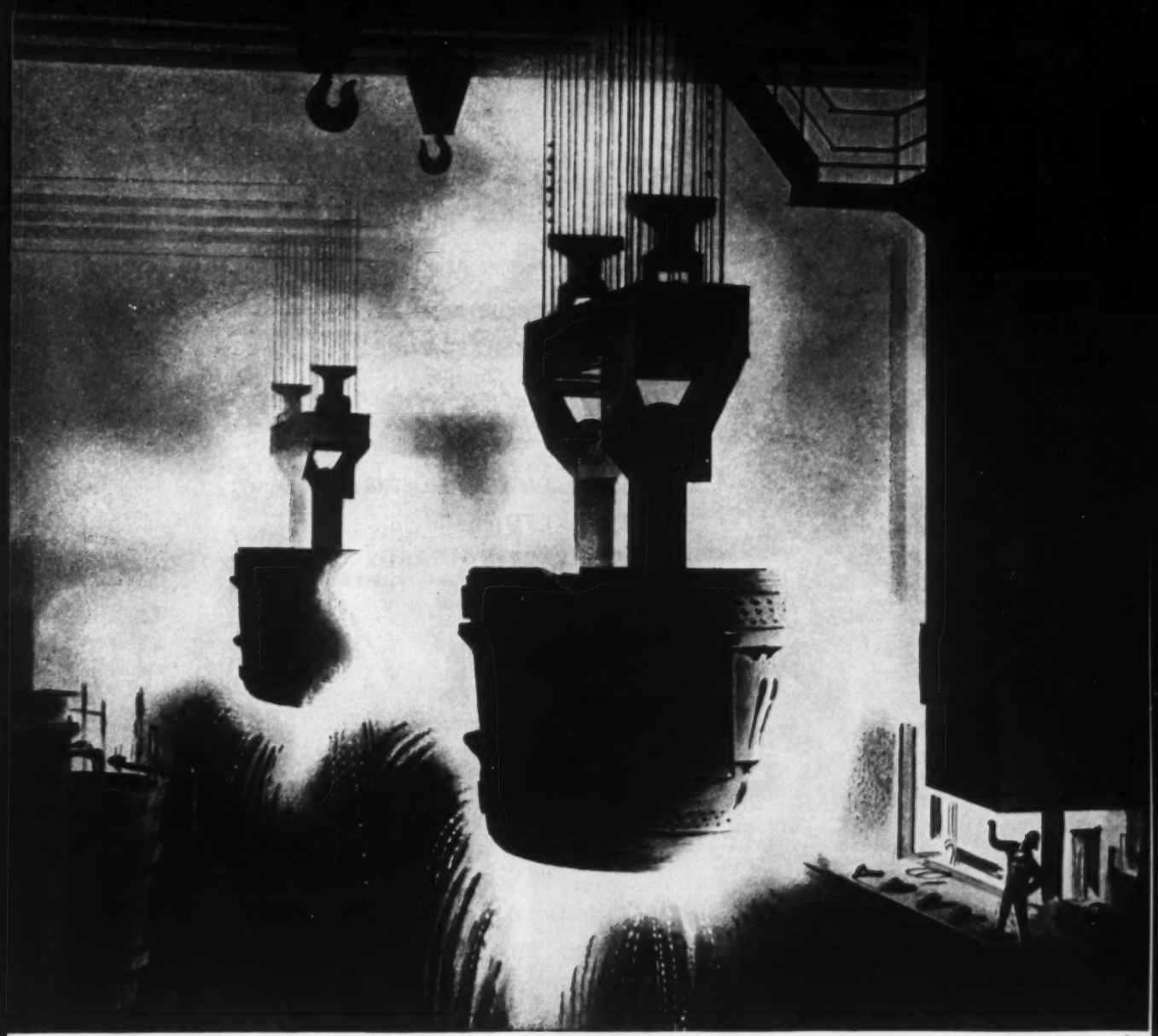


It's a six stand mill now, hard at work

Flying Shear First — To permit excavation work for the new flying shear foundation, all underground conduit in the area had to be abandoned and replaced by temporary wiring to operate the runout table motor drive rollers and similar facilities.

The new foundation for the shear and motor drive were built under the temporary tables and during the short maintenance shutdowns when the temporary tables could be removed. These foundations were constructed and ready to receive the shear and mill stand No. 6 without any appreciable loss of plant production. A portion of the new foundation for No. 5 had to be built later. It overlapped the

(*Please turn to p.* 139)



MORGANIZATION...way to cut costs

They expected a minimum of 20 years of service from the special-purpose Morgan crane we built for their steel mill. Already this steel company has received 39 years of service, almost double the expected life... and the end is still nowhere in sight. And, of course, the yearly expected cost of operating the crane has been reduced.

This is a typical result of "Morganization"... surveying, designing, building, and installing with the experience and *extra care* that make Morgan cranes and rolling mills and special equipment *last a lot longer*... and that make Morgan equipment cost less over those added years.

Write for booklet S-8, which describes "Morganization" and Morgan equipment for heavy service.

MORGAN ENGINEERING of ALLIANCE, OHIO

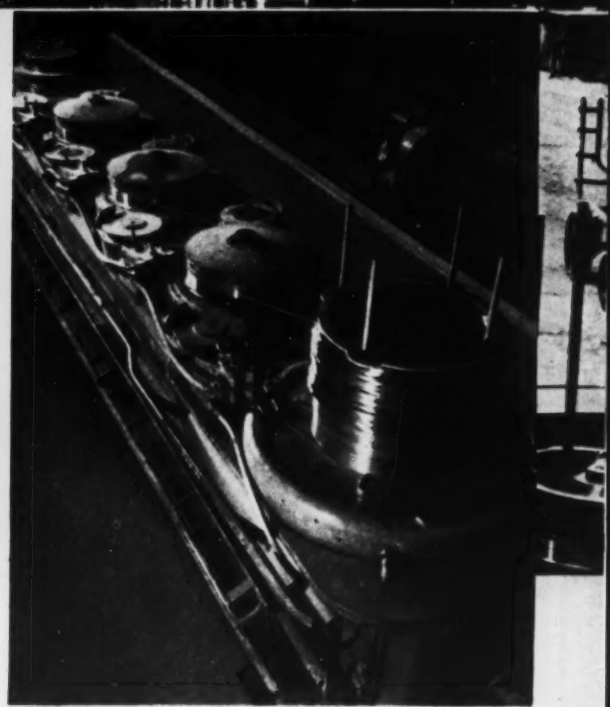
THE MORGAN ENGINEERING COMPANY, ALLIANCE, OHIO

Vaughn® MOTOBLOX®

FOR HIGH CARBON AND ALLOY
INCLUDING STAINLESS WIRE . . .

AIR AND WATER COOLING—COMBINED FOR TOP PERFORMANCE

ASSURING LOW TEMPERATURE
FROM START TO FINISH . . .
WITHOUT EXCESS STORAGE



THE VAUGHN MACHINERY CO.
Cuyahoga Falls, Ohio, U.S.A.

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

V® "Quick on the Draw!"

Progress . . .

(*Concluded from p.* 136)

existing foundation for the flying shear.

Motor Bases—Before and during construction of the shear foundation, the motor bases for mill stands No. 5 and 6 were being built in the motor room, ready to receive the new 5000 hp motor at stand No. 5 and the existing 3500 hp motor to be relocated from stand No. 4 to stand No. 6.

First shutdown required by construction was for a period of five 24-hour days, during which the existing flying shear and motor were relocated on new foundations and placed in operation, tested and retimed to provide for the 40-foot gap between the shear and mill stand No. 4. Two shifts of 12 hours each were worked each of the five days.

Back In Production—During the period between relocation of the flying shear and the second shutdown, all work required for installation of mill housings 5 and 6 was performed.

The concrete work for the new mill stands was completed, ready to receive the housings. Shoe plates were set for both of the new mills.

During this period, the new 5000 hp motor for stand No. 5 was assembled, and preparations were made for the removal of No. 4 3500 hp motor, and installation of the new 5000 hp motor in its place.

Second Shutdown — During this five-day shutdown, the mill housings for stands 5 and 6 were installed to the extent that most of the remainder of both mills could be installed after the shutdown. Existing 3500 hp No. 4 motor was removed from its base in the motor room and replaced with the new 5000 hp motor. No. 4 mill stand was placed into operation with its new motor, and work was commenced on permanent installation of the existing 3500 hp motor at No. 6 location.

Work was done on revisions to existing No. 1 downcoiler, sufficient to eliminate an additional shutdown on this facility at a later date, and other isolated work requiring mill shutdowns was accomplished, including the balance of the additional rollers on the runout table.

Commence Rolling—During the period between the second and third shutdowns, electrical work was completed except for final connections. The rectifier transformer and new rectifier were installed, tested and then degassed. Bus work was complete, switch gear and panels installed.

All piping was completed on the mill stands and other places, except for connections and portions that could not be installed until rolls were placed in the new mills. All mechanical and other work on the new mills that could be installed while the mill table was in use was completed. The only unfinished work consisted mostly of items like installation of Morgoil gearings, spray piping nozzles, loopers and chutes, installation of rolls and final electrical testing or mechanical testing of equipment.

Day Shift Work—The work in this period was facilitated by utilizing the two night shifts for operating the mills which left the days free for construction. Each morning at eight, if necessary, the temporary tables between mill housings were removed. The area was then clear for construction use until near the end of the eight-hour shift. All temporary roller tables were back in place by 4 pm and ready for use by the production forces, which operated the following two shifts.

Last Shutdown — During this period of six days, the new mill stands and motor drives were completed.

Bearings, rolls, loopers, flying shear pinch roll, chutes, spray piping, and final electrical connections were installed and tested under operating conditions. Additional work on relocation of controls at No. 1 downcoiler was completed to avoid a future shutdown.

At the end of the last shutdown, the mill was operated under load by production forces, and final sequence checks were made with the mills operating normally.

Actual downtime was 390 hours, which was divided into three periods and spread out over six months in such a way that loss of production was comparatively light.

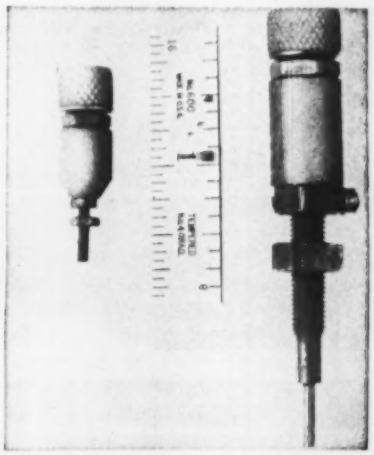
Fast Temperature Gage

The Midwest Research couple is also rugged enough to take rough treatment

TO MEASURE rapid temperature changes in metal wall surfaces you need a thermocouple that features speed of response. A new type developed by Midwest Reseach Institute does the job; and it's rugged enough to stand up under rough conditions.

The development project was ordnance-inspired because of the couple's potential use in gun bores. But it can record temperatures in such equipment as cylinder and piston walls, brake drums, aircraft skins, autoclave walls and air ducts.

Speed to Burn—A 1-micron (0.00004-in.) plating at the junction minimizes the response time of

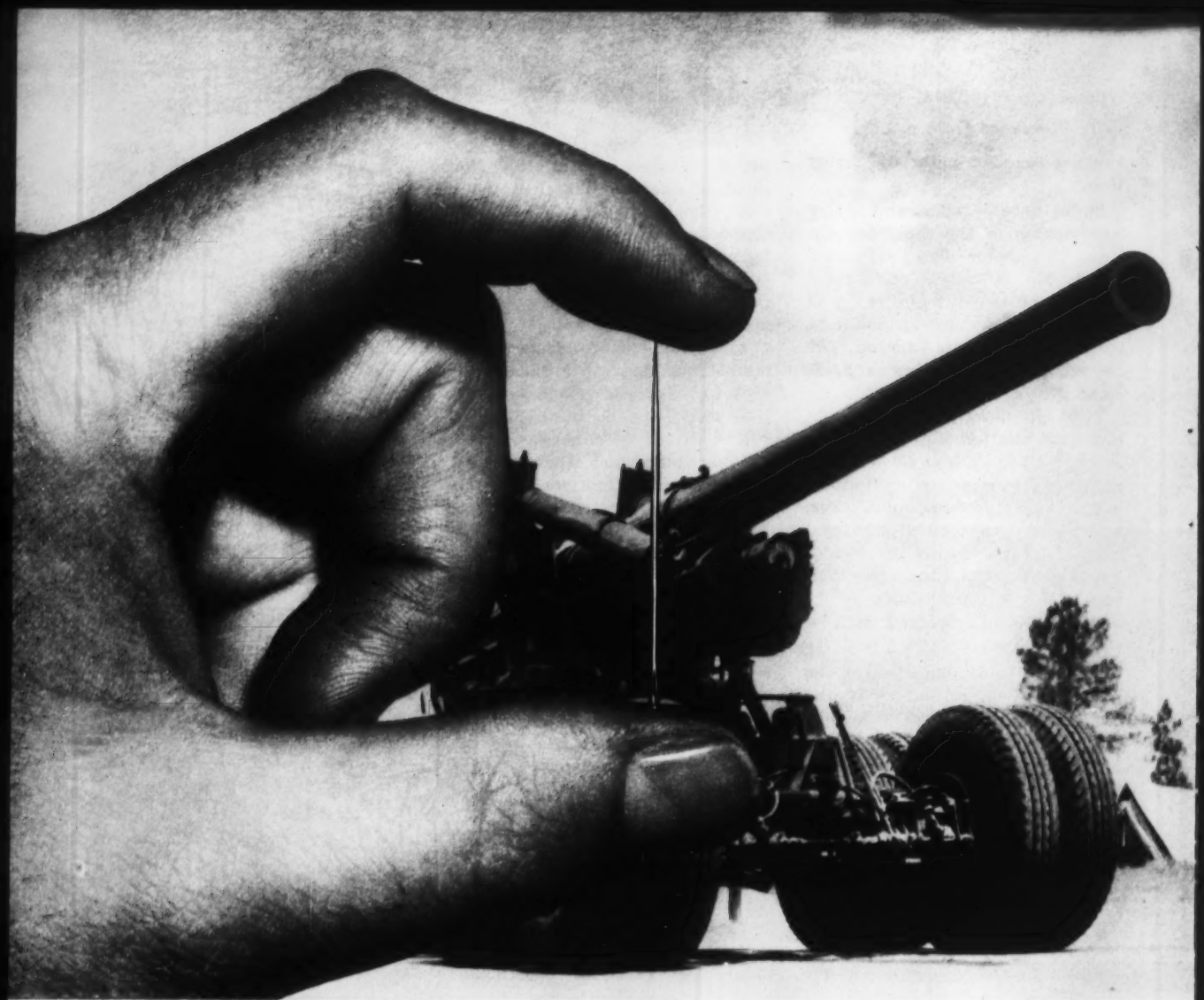


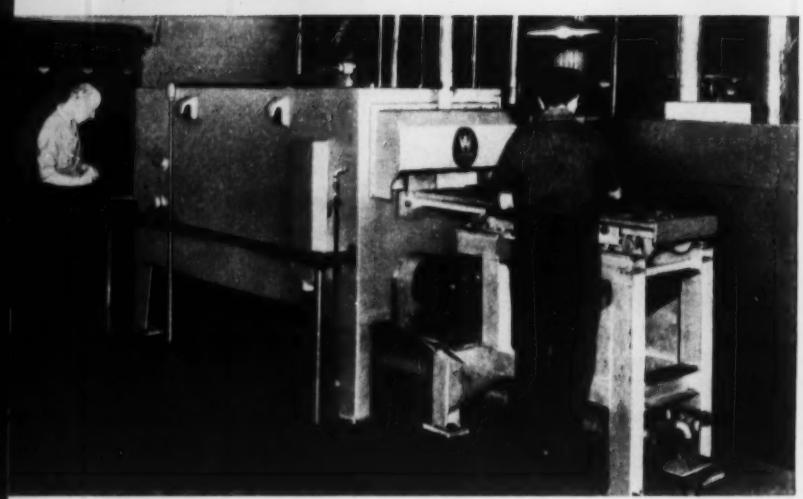
WALL SURFACE 'COUPLE
. . . keyed to fast response

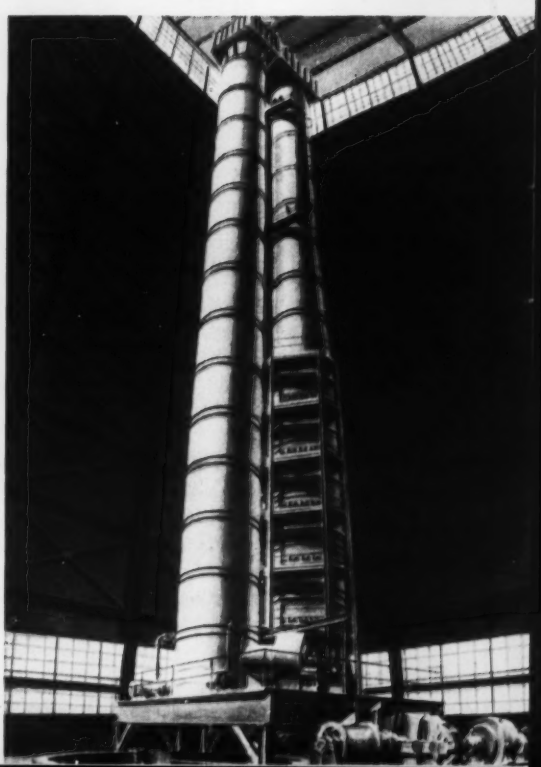
the instrument to temperature change. It's been determined that time required for the junction temperature to reach 63.2 per cent of the amplitude of a stepchange of the exposed surface is about ¼-microsecond.

MRI's thermocouple is built to take hard treatment; it has tested satisfactorily at pressures up to 60,000 psi under severe mechanical vibration.

Two Models—Two models have been developed: The smaller unit in the photo above for use in thin walls; the larger is used for thick walls.







FROM BOX TYPE TO ELEVATOR TYPE . . . this wide range of Westinghouse furnaces offers industry heat-treating units specially engineered for the smallest toolroom jobs on up to furnace capacities for massive parts treating. Accurate temperature control, uniform temperature distribution and low heat loss in Westinghouse furnaces assure high and constant quality level.

Needles to cannon barrels . . .

heat-treat them in Westinghouse furnaces

Across the board in heat-treating, for small jobs or mass production, Westinghouse makes the exact furnace needed. From manually operated box type to complex automatic conveyor units, Westinghouse furnaces assure the maximum in speed, quality and economy.

This complete line includes furnaces using either gas or electric heat source . . . atmosphere generators providing all gas variations required . . . and auxiliary equipment to speed and simplify work handling.

Specialized Engineers and Facilities Work for You

Westinghouse offers a unique and comprehensive service that extends ideas, know-how and capacity to solve heat-treating problems. At any stage of planning or production, Westinghouse engineers can be called to your plant for sound, unbiased recommendations that will help you get more from heat-treating operations. Skilled designers, packaged installation techniques (even to complete erection and installation where needed) and maintenance follow-through, combine with this engineering staff to form a dependable service that is unmatched in the heat-treating field.

Use coupon below for your free 40-page book on the complete line of Westinghouse furnaces and equipment. For further information write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-10433

YOU CAN BE SURE...IF IT'S Westinghouse

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3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania
Please send free copy of B-5459 to:

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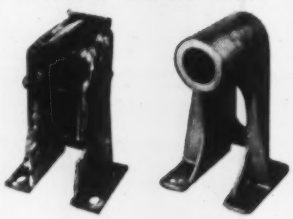
...How about Malleable?

Streamlined Castings Save Weight Cut Production Costs

Replacing complicated expensive assemblies with accurate malleable castings not only can reduce weight but often actually increases the strength and durability of the product. Malleable's versatile castability permits it to be cast in intricate shapes close to final form, making possible streamlined design to improve product appearance. Malleable's excellent machinability means trouble-free and low-cost machining in the shop.

Take advantage of malleable iron's remarkable combination of machinability, toughness and resistance to shock and corrosion. Specify malleable when designing new products or looking for ways to improve present production.

Malleable Casting Reduces Weight of Roller Guide 26%



22.15 lb. Fabricated Assembly

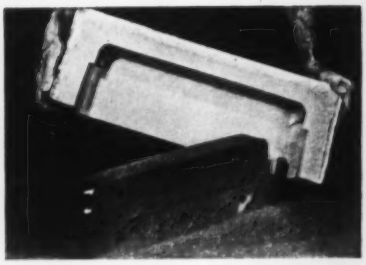
16.30 lbs. Malleable Casting

Replacing the fabricated elevator safety device roller guide with a malleable casting of equal strength saved 5.85 lbs. per guide.

Send for "Malleable Iron Facts No. 47". Tolerances and specifications of malleable castings to help you design for malleable. Ask your malleable casting supplier or write to the Malleable Founders' Society.

Malleable FOUNDERS' SOCIETY

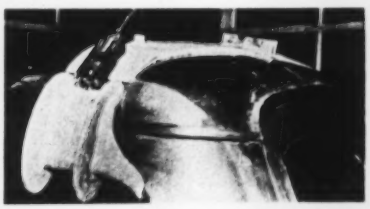
1800 Union Commerce Building Cleveland 14, Ohio



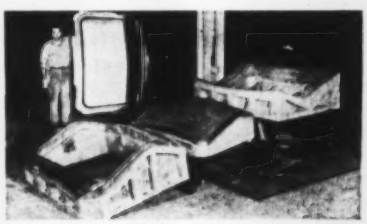
Die face model is cast from positive model of the finished product. Face model is then used as a Keller duplicator pattern to reproduce the female die in steel.

Plastic Tooling

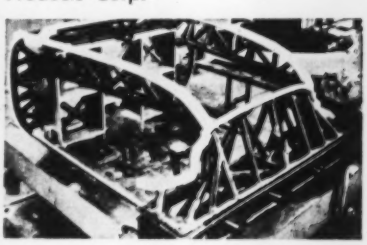
VERSATILITY of epoxy resin tooling is revealed in this series of photographs. The basic resins used are manufactured by Bakelite Co. division of Union Carbide and Carbon Corp.



Jig for spot welding automobile bodies is molded by casting plastic compound against a fnished body or model. This one holds top and sides of station wagon together.



Cold rolled low carbon steel, 0.036 in. thick, is formed into luggage compartment doors by plastic faced draw die at Hillsdale, Mich. plant of Allied Products Corp.



Front end checking fixture used on c 1955 automobile is practicable because of high dimensional stability of epoxy compound.

Nothing in this Head but BUSINESS

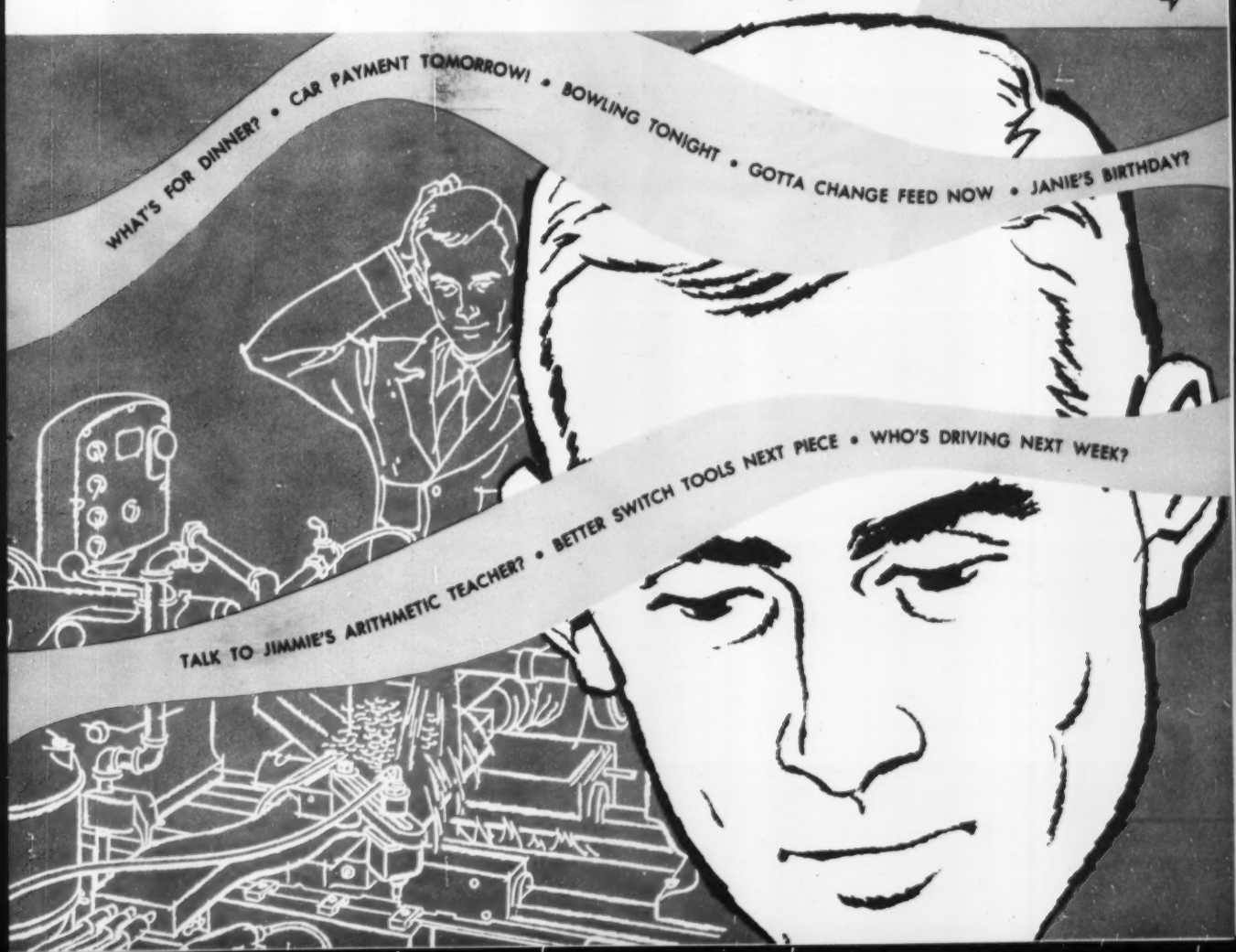
See for yourself how Monarch Air-Gage Tracer Controlled Turning—

Speeds production—virtually eliminates spoiled work due to human error—no need for repetitive measurements—cuts turning time—reduces or eliminates grinding time—slashes setup time—equally suitable for both long and short runs.

THE MONARCH MACHINE TOOL COMPANY • Sidney, Ohio

These Job Reports Prove It

SEE NEXT 3 PAGES

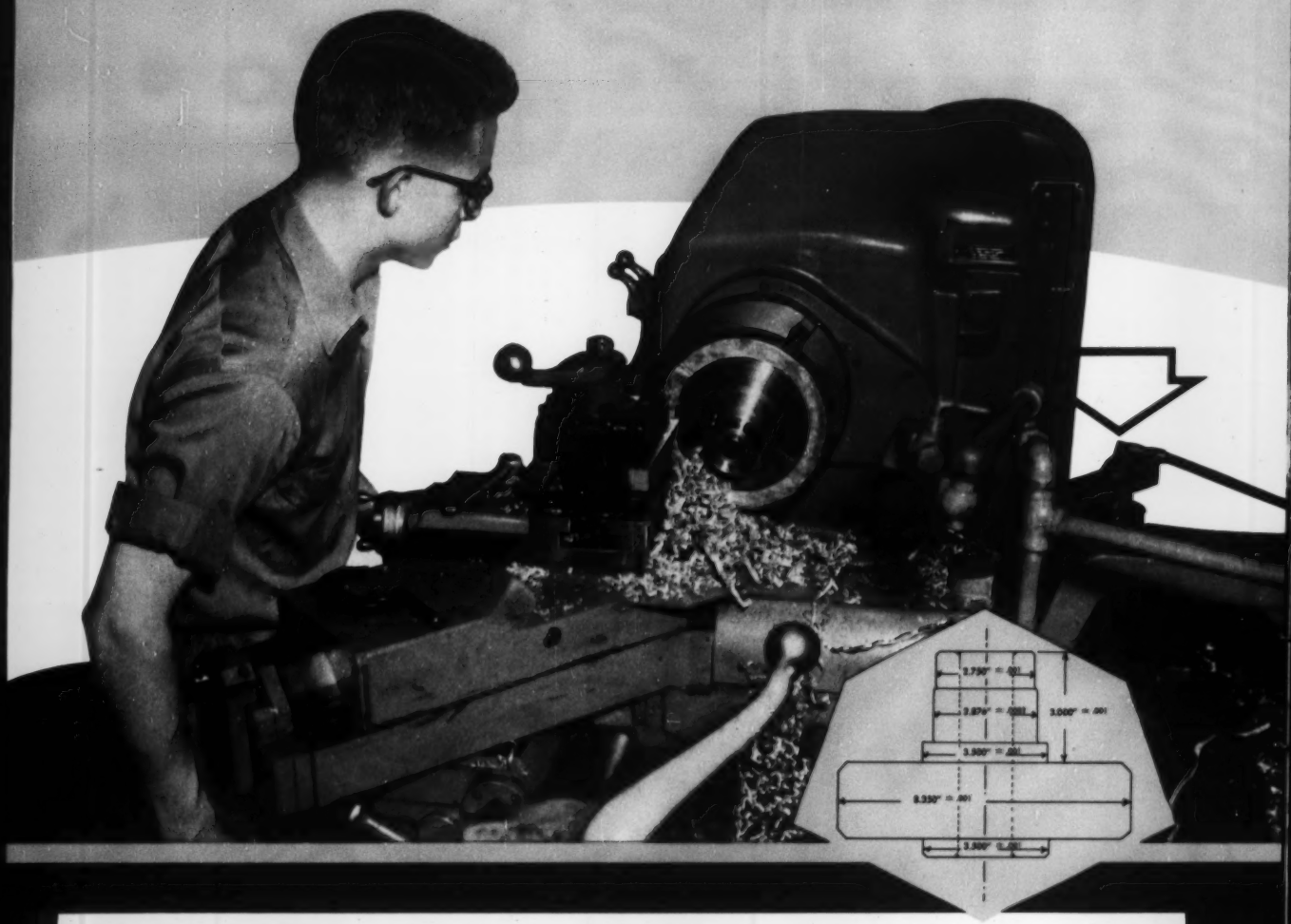

WHAT'S FOR DINNER? • CAR PAYMENT TOMORROW! • BOWLING TONIGHT • GOTTA CHANGE FEED NOW • JANIE'S BIRTHDAY?
TALK TO JIMMIE'S ARITHMETIC TEACHER? • BETTER SWITCH TOOLS NEXT PIECE • WHO'S DRIVING NEXT WEEK?

WHAT A HEAD FOR BUSINESS!

Phenomenal reductions in turning time, when the Monarch Air-Gage Tracer starts turning the work, are reported to us over and over again by pleased and happy customers. See if any examples on these pages or the next are similar to any problem of your own. If not, the coupon on the second page following will bring you full details and many more examples—or a job report of your own.

As you analyze these cost-reducing production figures, don't overlook the Air-Gage Tracer's accuracy and versatility. The movement of slide to control point repeats itself within a limit of .0001", making it the most accurate of all duplicating devices. Recommended for turning multiple diameter shafts, and turning, boring and facing contours, its versatility accommodates it to a great variety of work.

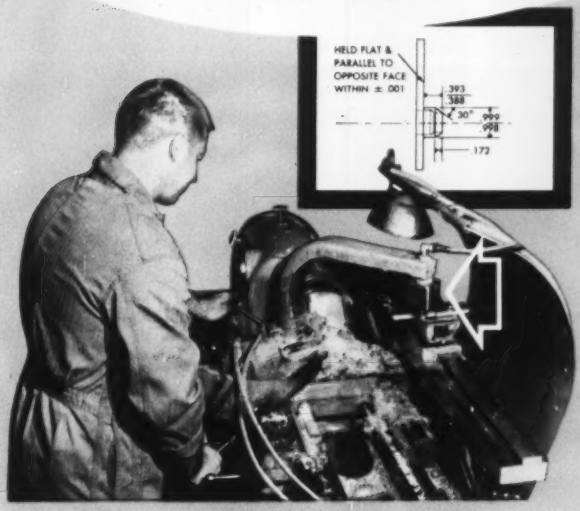
Why can't the Air-Gage Tracer give *your* production a boost? Can't you use help like this? Study the jobs—send in the coupon—and let Monarch take it from there... *The Monarch Machine Tool Co., Sidney, Ohio.*



AIR-GAGE TRACER TIME, FLOOR TO FLOOR—6 Minutes.
OLD TIME—50 minutes.

Part—Bronze Worm Gear. **Machine**—20" Series 60 "Air-Gage Tracer." **Material**—high tensile manganese bronze. **Operation**—rough and finish turn complete. **Cutting tool**—carbide. **Limits**—±.0002" ball bearing fit limit is held on one diameter. **Other limits** are ±.001". Total floor to floor time is 6 minutes against 50 minutes on a turret lathe—more than 8 times the production!

Check these Air-Gage Tracer Reports

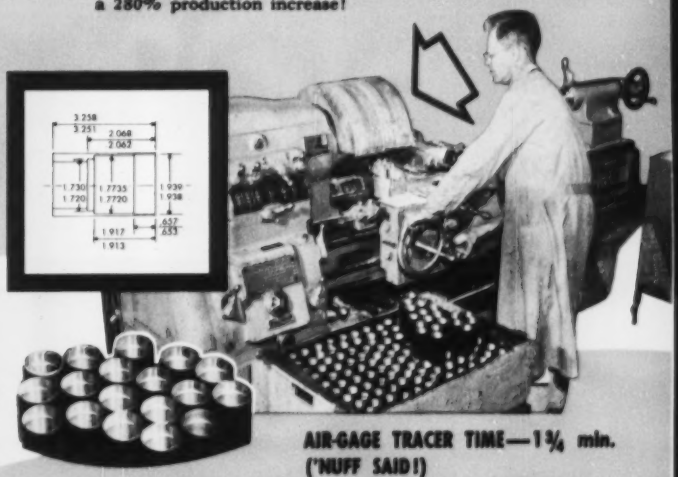


AIR-GAGE TRACER TIME—4¾ min.
OLD TIME—7 pieces per hr.

Part—Housing Cover. **Machine**—10" Model EE Air-Gage Tracer. **Material**—aluminum forging. **Operation**—turn, face and chamfer. **Limits**—portion of part which is faced held flat and parallel to opposite face within ±.001". Total floor to floor time is 4¾ minutes compared with production of 7 pieces per hour previously.

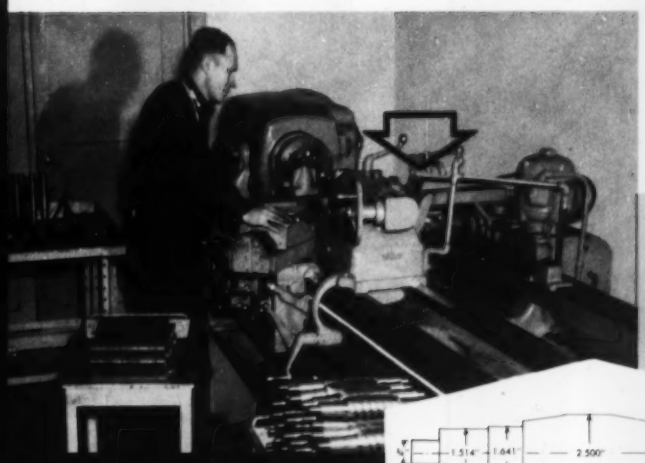
AIR-GAGE TRACER TIME—6.9 pieces per hr.
OLD TIME—1.8 pieces per hr.

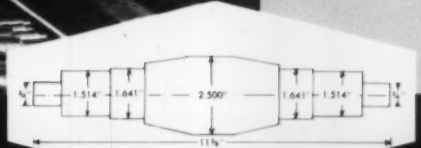
Part—Motor Shaft. **Machine**—16" Series 60 "Air-Gage Tracer." **Material**—SAE 1045 bar stock, 1-13/16" diameter x 25-13/16" length. **Operation**—turn complete. **Cutting tool**—carbide. A completely finished work piece (after all machining operations) is used as a round template. Previous to installation of "Air-Gage Tracer" 1.8 pieces were produced per hour, now 6.9 pieces are produced per hour—a 280% production increase!



AIR-GAGE TRACER TIME—1¾ min.
('NUFF SAID!)

Part—Motor Shell. **Machine**—13" Series 60 "Air-Gage Tracer." **Material**—seamless steel tubing. **Operation**—bore and internal face. Total floor to floor time is 1¾ minutes. This is another good example of the proficiency of the "Air-Gage Tracer" on bore operations. There are three bores of different dimensions and the material is seamless steel yet the operator turns the parts out without fear of spoilage and in the remarkably short floor to floor time of 1¾ minutes.





AIR-GAGE TRACER TIME—10 min. per piece
OLD TIME—60 min. per piece

Part—Worm Shaft. **Machine**—20" Series 60 "Air-Gage Tracer." **Material**—4340 steel. **Operation**—rough and finish turn complete. **Cutting tool**—carbide. Total floor to floor time is 10 minutes per piece compared with 1 hour required previously. Six times the production!

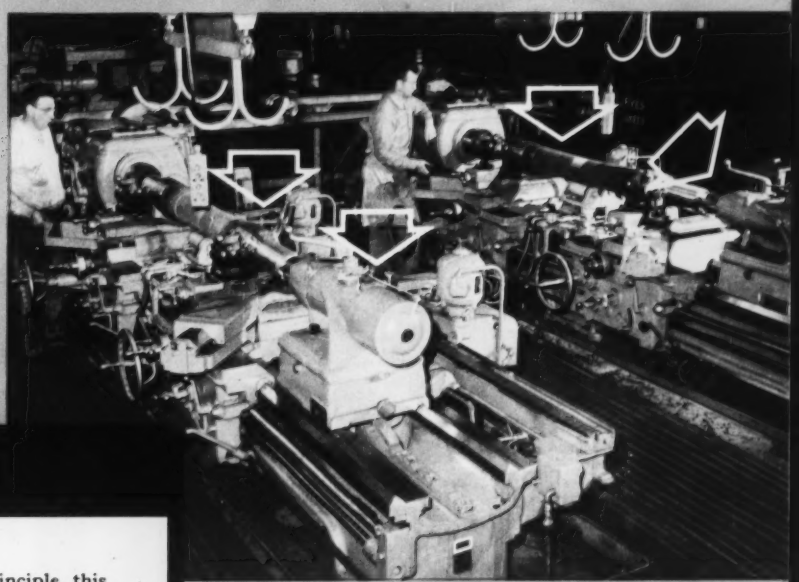
THE MONARCH MACHINE TOOL COMPANY, SIDNEY, OHIO

See Next Page for COUPON

TWO DOUBLE-HEADERS double the output

AIR-GAGE TRACER TIME—7½ min.
OLD TIME—15 min.

Part—Anti-friction freight car axle. Machine—Monarch 25″ x 120″ Heavy Duty Lathe with dual carriages, each Air-Gage Tracer controlled. Material—A.I.S.I. C1040 steel forging. Operation—finish turn journals, journal dust guards and radii—both ends. Limit—±.001″. Engine and center drive axle lathes with expensive form tools, previously used, presented difficulty in maintaining center distances of radii. Air-Gage Tracer turns journal O.D. and radii with desired accuracy, allowing plunge grinding without excessive grinding wheel breakdown, as before. And production is doubled!



ASK FOR INFORMATION!

Hydraulically operated, controlled on air-gaging principle, this is the most accurate duplicating device on the market. With tracer stylus operating on a pressure of only 5-6 ozs., change in template contour converts to corresponding tool position in thousandths of a second and movement of slide to control point repeats itself within a limit of .0001″. It can be applied as factory equipment on all sizes of 10″ to 32″ machines, the Mona-Matic and Right Angle Lathes—exclusive swiveling type optional on most of them. With the Auto Cycle Unit, many Monarch Lathes with Air-Gage Tracer Controls become fully-automatic, high-production units. Air-Gage Tracer controlled lathes can be converted to or from manual control in seconds.

ENGINE LATHES—10″ to 32″
TOOLMAKER'S LATHES—10″ to 20″
THE MONA-MATIC—for high production metal turning
THE SPEEDI-MATIC—a fast, precision hand screw machine
THE MONARCH MOTOR-TRACE
THE MONARCH-KELLER TURNING MACHINE
THE MONARCH AIR-GAGE TRACER
THE MONARCH ROLL TURNING LATHES
THE MONARCH 60″ RIGHT ANGLE LATHE
THE SHAPEMASTER ENGRAVER
SPECIAL TURNING MACHINES

THE MONARCH MACHINE TOOL COMPANY
SIDNEY, OHIO

Monarch
ACCURACY • ECONOMY • LONG LIFE
TURNING MACHINES

FOR A GOOD TURN FASTER . . . TURN TO MONARCH

Gentlemen:

☐ I am interested in your Air-Gage Tracer story and would like to receive your illustrated Booklet, with complete data and job performance reports. Please send me your Booklet 2607 without obligation.

☐ Please have a Monarch sales engineer call on me.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

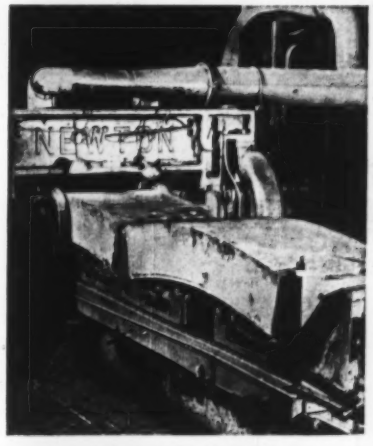
Heavy Milling Job

Home-made carbide cutters grind 7-ft tunnel sections. Others failed at the same job

HEAVY-DUTY straddle milling of 7-ft Lincoln Tunnel segments with home-made 20-in. "catheads" and other special heavy-duty milling cutters employing carbides is being performed successfully on 28-year-old duplex milling machines at a large eastern foundry and machine shop.

The 7-ft segments are 32 in. wide, 14 in. deep and weigh close to a ton each. Earmarked for the third tube of the Lincoln Tunnel, approximately 28,000 cast iron segments are needed. In addition, over 1800 steel segments will be used at points where the tunnel enters rock to withstand bending stresses.

The Problem—While the segments are still hot from the foundry, they are stored on open ground. Large sand inclusions are imbedded into surfaces requiring machining. Because of the sand inclusions, coupled with the



HOME-MADE CUTTERS
. . . 100 to 180 pieces per grind

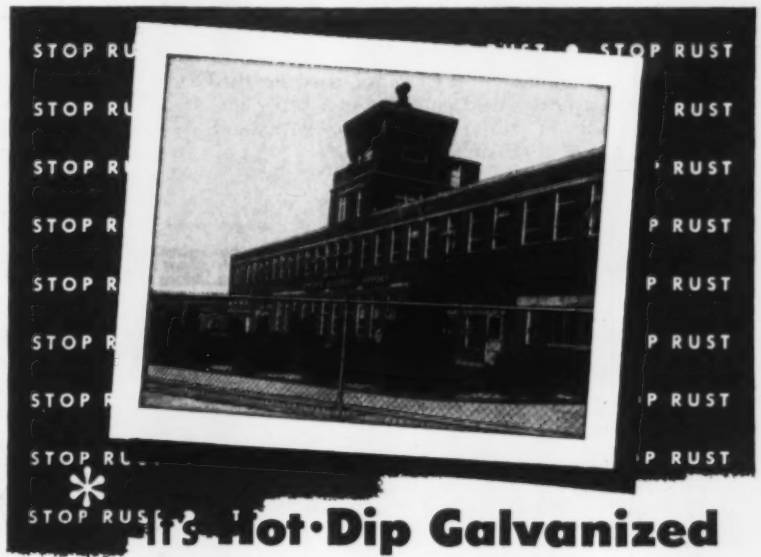
age of the machines, initial machining was attempted with high speed steel. However, these tools burned up before completing one segment.

An attempt was then made to mill with carbide. The several grades and types applied at the outset resulted in broken blades and, in many cases, excessively worn tips.

Machining with Grade M on the steel segments and Grade GS on the cast iron segments was recommended by a Wesson Co. field engineer. As evidence of the success of these carbides, the company now is producing from 100 to 180 pieces per grind. Both of these Wessonmetal grades designed for heavy shock applications have inherently high wear resistance.

Salvage—Because a large number of high speed steel milling cutter blades had been obtained for the operation, they were salvaged by annealing and milling pockets into which the Wessonmetal carbide tips were brazed.

Two segments are milled per setup averaging 35 minutes. This includes cutter changes, set up, etc. Operating the milling machines at maximum speed of 110 sfm, feed on the steel segments is 6 ipm and 14 ipm on the cast iron segments. Average depth of cut ranges from ⅜ to ½ in.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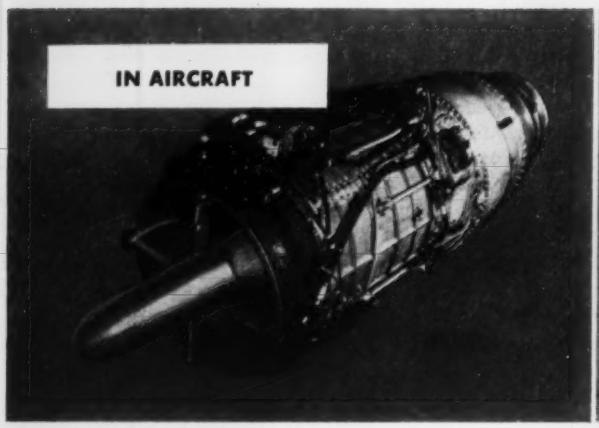
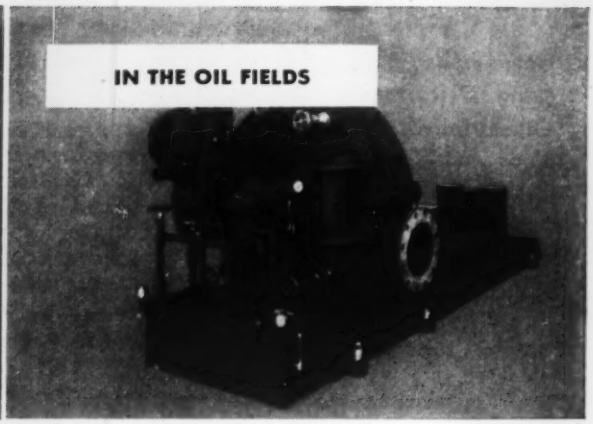




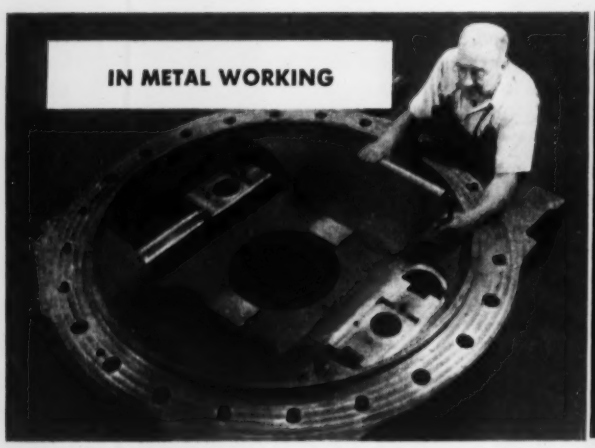
AHEAD OF THE VAPOR TRAIL . . .

CIRCLE Ⓛ Stainless Steel Castings, used for turbine shrouds, heat shield supports and other important parts of turbo-jet engines, withstand temperatures of approximately 1500° F.

IN GIANT NATURAL GAS TURBINES . . .

CIRCLE Ⓛ Stainless Steel Castings were selected to withstand the terrific heat and pressures needed in powering heavy-duty oil pumps delivering thousands of barrels of oil a day.

UNIQUE STEEL CASTINGS ARE COMMONPLACE AT LEBANON



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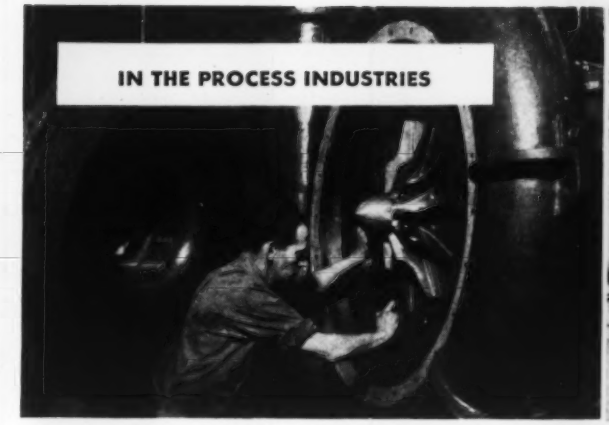
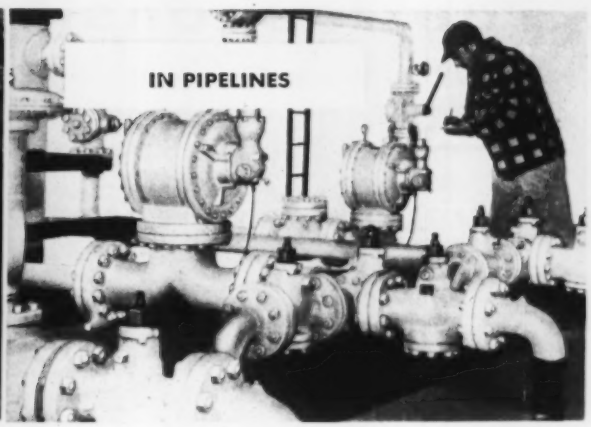
Lebanon Steel Foundry research is continually developing new processes to improve the performance and economy of CIRCLE Ⓛ Castings. Such research has led to the use of the shell molding process to meet certain customer specifications.



AT THE CENTER OF A MINIATURE TORNADO . . .

CIRCLE Ⓛ Steel Castings for the one-piece, open type, radial bladed impellers are the "tornado blowers" in single-stage centrifugal blowers that are widely used in the process industries.



COUNTING THROUGHPUT OF THESE LIFELINES . . .

CIRCLE Ⓛ Steel Castings form valve bodies for the huge meters that count the billions of barrels of oil flowing through many of the country's pipelines.

Whatever the specification . . . whatever the size . . . from castings weighing only a few ounces to giants of several tons . . . Lebanon Steel Foundry CIRCLE Ⓛ Castings are made to the highest standards of excellence.

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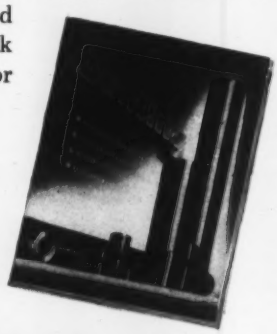

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Sintered Battery Plates

BATTERY plates composed of 80 per cent air contain the secret of the long-life nickel-cadmium battery, says A. J. Langhammer, president of Chrysler Corp.'s Amplex Division.

The plates are made of carbonyl nickel powder, a high purity nickel. This powder is finer than most metal powders, particles measuring only 30 to 6 microns. Nickel wire screens help to hold the powdered nickel in place.

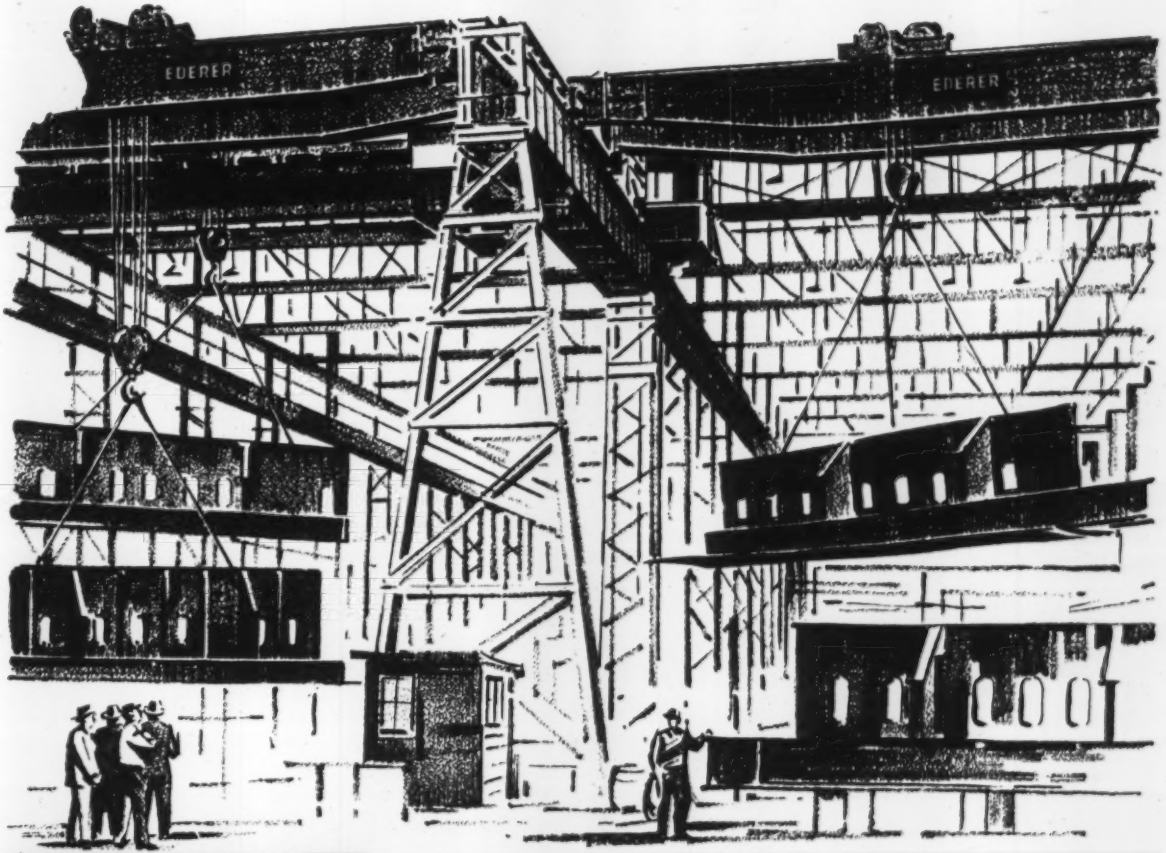
Pores Important — The plates have up to 80 per cent porosity, but the pores are so tiny they are impossible to see with the naked eye. Value of this feature is the great surface area that can be impregnated with nickel and cadmium electrolytes, thus giving greater current capacity. One type of battery consists of 15

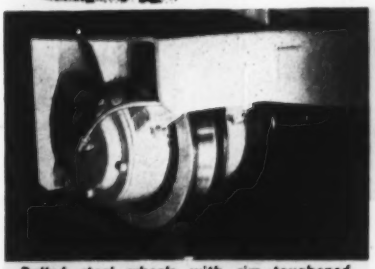
BATTERY PLATES
. . . porous sintered nickel sheet

plates ranging in thickness from 0.026 in. to 0.085 in. Plates are separated by protecting layers of plastic and fabric.

Amplex plants in Detroit and Trenton, Michigan, are currently tooled for production of the plates. Great care is taken in manufacture to keep plates scrupulously clean. Workers must have clean hands, plant floors are vacuumed and packing material is virgin cardboard.

Cold No Problem—The battery will operate in temperatures as high as 165 F and as low as −65 F. Life is many times that of a lead-acid battery. The battery will retain a working charge for as





Rolled steel wheels with rim-toughened treads are pressed on and keyed to axles which turn on spherical roller bearings.

Bridge drive shaft, with self-aligning ball bearing pillow blocks, has steel safety type flange couplings mounted close to wheel for easy wheel removal.

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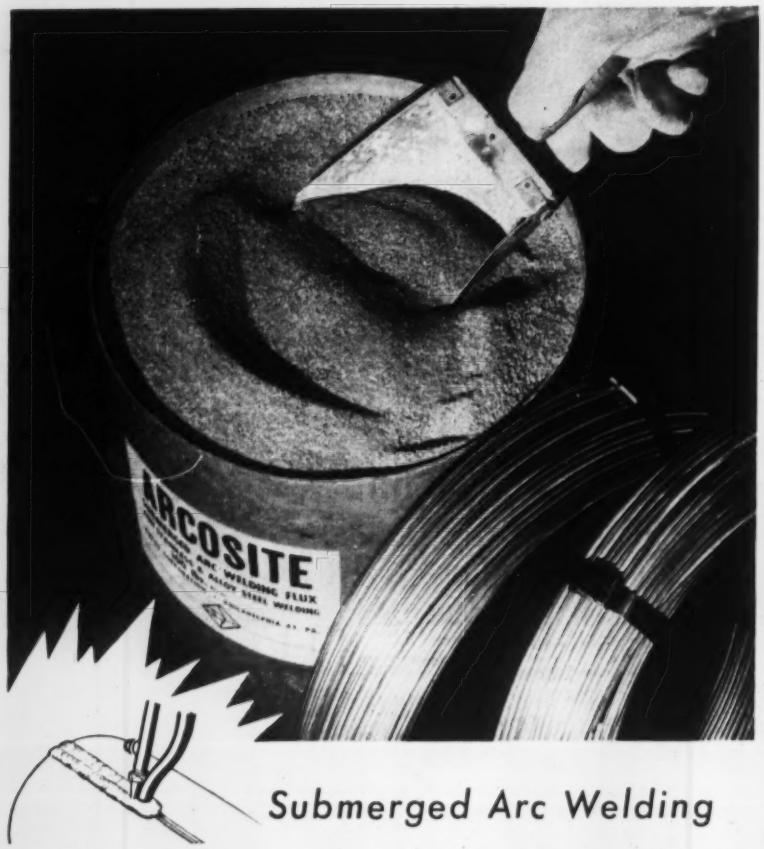

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Now, for the first time, you can apply the economy of submerged arc welding to stainless steels. No longer need you worry about cracking, or poor transfer of the essential stainless elements. The combination of *new* ARCOSITE FLUX and *new* ARCOS CHROMAR (Stainless Steel) WIRE provides a balanced analysis for sound, dependable welds on every job. It's another example of how Arcos experience with coated electrodes and weld metallurgy is being translated into tangible benefits for you.

Write today for the Arcosite Flux Bulletin and see how you may profit from these two *new* Arcos products. Arcos Corporation, 1500 South 50th Street, Philadelphia 43, Pennsylvania.

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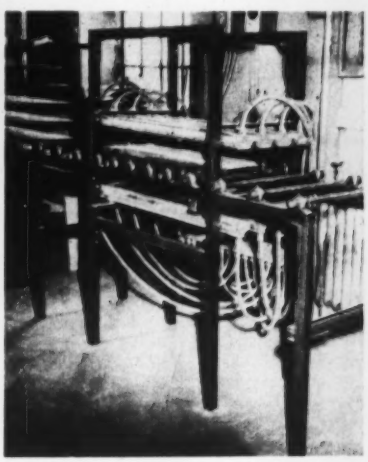
STAINLESS WIRE AND ARCOSITE FLUX

long as a year when standing idle and can be 50 per cent charged in 15 minutes and completely in an hour.

Until recently, military demand for nickel restricted the use of this battery to the armed forces, but it is now becoming increasingly available for automotive and other applications.

Radiant Heat Effective

TIME required to bake electric furnace heating elements has been reduced from 2 hours to 15 minutes by using far-infrared electric radiant heaters. Additional savings and improvement of the product are also reported by Cooley Electric Mfg. Corp., Indianapolis, manufacturer of heating elements



FAR-INFRARED OVEN
. . . baking time cut to 15 minutes

used in their line of industrial electric furnaces.

Process consists of molding the elements into rectangular or semicylindrical shapes. Before molding, the granular material is moistened as in molding foundry sand. This moisture must be removed by baking at approximately 300 F before firing at higher temperatures.

Previously Damaged — Convection heating was previously used to dry the elements, but heating time could not be reduced without damaging the units. Forced heating, it was found, caused surface hardening which inhibited release of steam from inside the block.

An experimental installation of Chromalox electric radiant heat-

ers was tried, and it was found that only one-eighth of the best previous time was then required to dry elements as thick as ¾ in. In addition, it was discovered that the penetrating heat resulted in desirable, rather than damaging structural changes in the elements, greatly increasing their strength and thermal conductivity.

Success—As a result of the experimental work, a permanent far-infrared oven was constructed using 8 Chromalox radiant heaters rated at 1.8 kw each. These units were easily mounted on a simple structural steel frame so that elements being baked are held on rollers while radiant heat is focused on them from above and below.

Company reports that the new installation has produced the added advantages of reduced overall power consumption, greater flexibility of production, and requires fewer molds to make a given quantity of elements. Since the molds used are relatively expensive, new element sizes can now be manufactured at less cost and with greater facility.

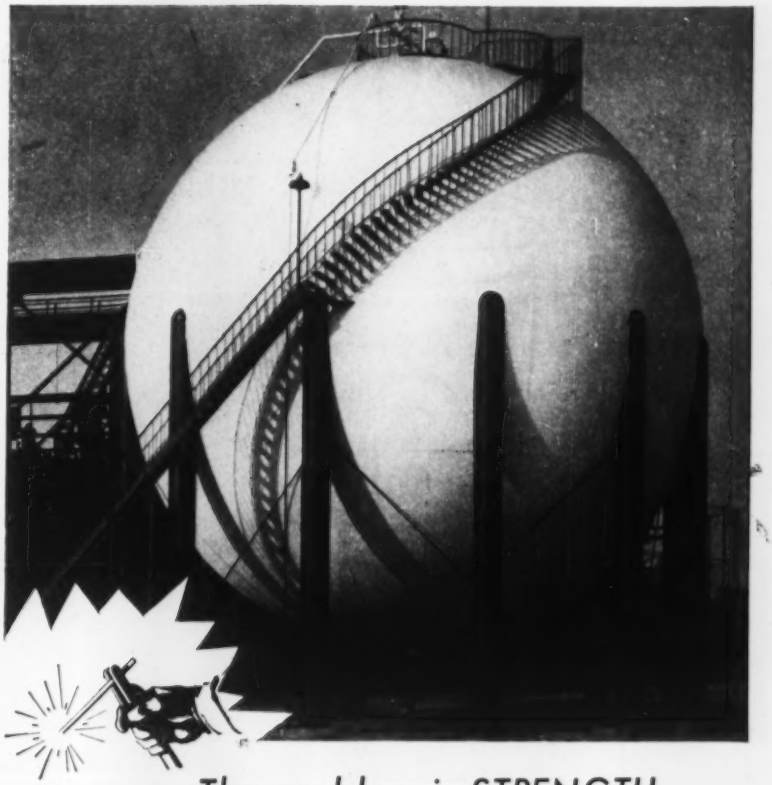
Silicon Control Studied

Steel companies are aiming at improving iron from blast furnaces by controlling the silicon content, according to James C. Fulton, development metallurgist, Allegheny Ludlum Steel Corp., Pittsburgh.

Mr. Fulton explained that it is desirable to know more about the chemical behavior of silicon in the blast furnace so its presence can be turned to advantage, rather than permitting it to remain a trouble-maker. Experiments have shown that silicon may actually be helpful in removing sulphur from the iron, he said.

At an AISI Pittsburgh regional meeting he described laboratory work which emphasized the close relationship between silicon and sulphur in iron manufacture. Because of this, much of the information on the behavior of silicon is contained in literature originally written on desulphurizing phenomena. Most of that information is contained in the literature dealing with basic slags, Mr. Fulton, told the group.

ARCOS FOR FINEST QUALITY WELDS



*The problem is STRENGTH... and the WELDS **must not** fail*

A Hortonsphere* is the practical answer to the problems presented by the tensile stress inherent in the storage of gases under high pressure. Its spherical shape assures uniformity of stress—but because all stresses are in tension—the tensile strength of the weld must match that of the high-tensile, low-alloy-steel base metal.

All-welded field fabrication is easy and economical on applications like these with ARCOS Low Hydrogen Electrodes. Welds are uniform whether performed down-hand, vertical or overhead. Economy is assured because *one* electrode that is "just right" for the job can be used for all-position welding. What's more, no preheat is needed to prevent underbead cracking.

When you have a field welding application, or a shop welding problem on high-tensile steels, weld with ARCOS Low Hydrogen Electrodes for assured weld quality . . . time and money savings on the job.

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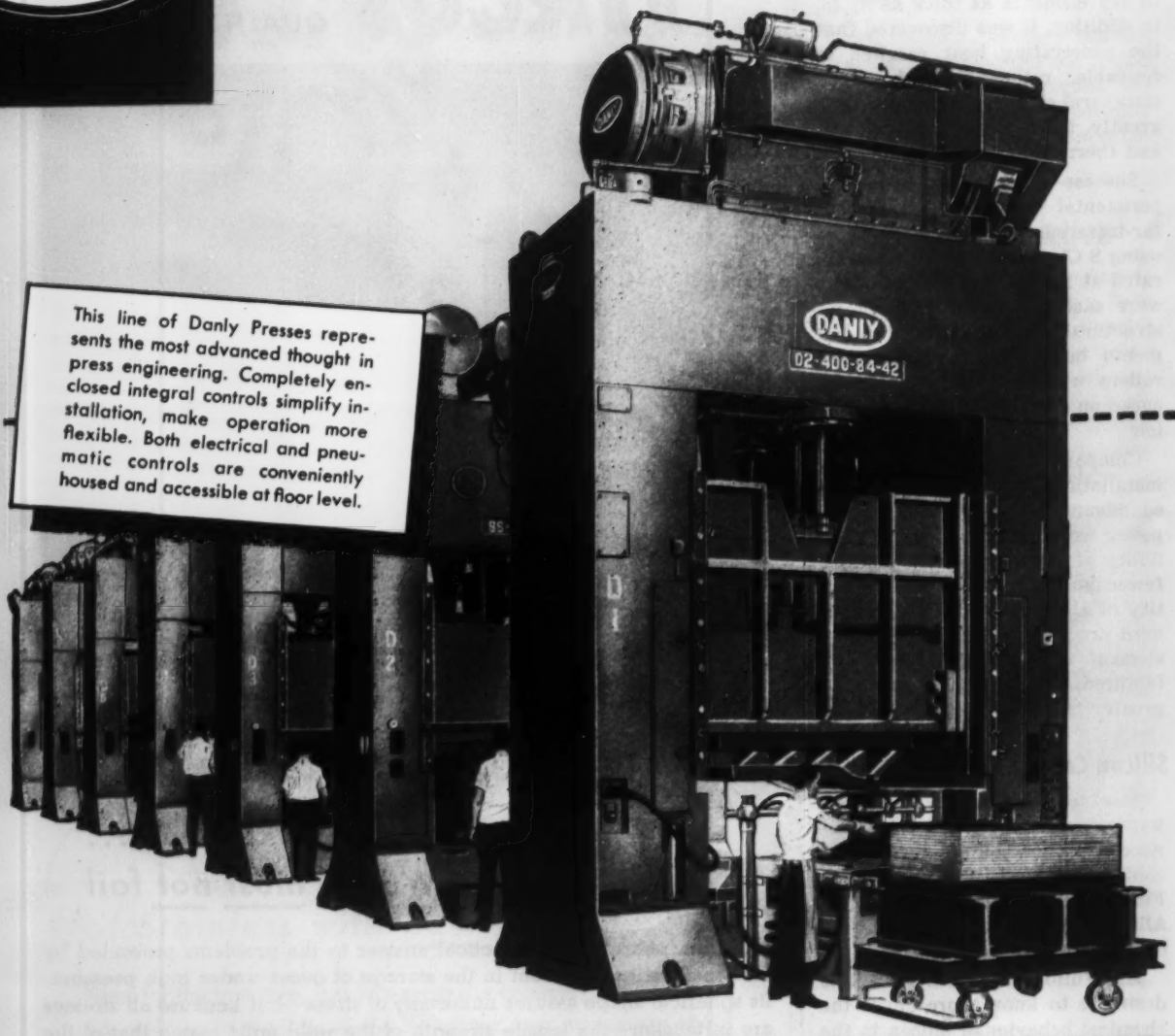
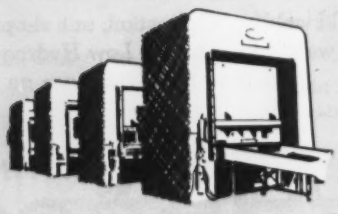
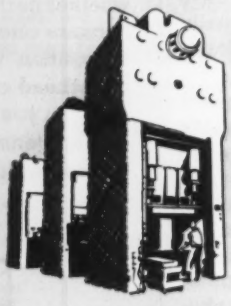
This line of Danly Presses represents the most advanced thought in press engineering. Completely enclosed integral controls simplify installation, make operation more flexible. Both electrical and pneumatic controls are conveniently housed and accessible at floor level.







Danly offers any press you need for blanking, drawing or any secondary operation . . . single, double or triple action . . . overdrive or underdrive . . . to suit your plant layout. Make your press line a Danly line and save costs at every stage of your stamping operation.

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COSTS LESS ON A DANLY PRESS

When you get a tough draw job . . . put it on a Danly

Danly Presses reduce the cost of your drawing operations by producing more stampings per shift. Their proved mechanical worth adds up to greater production, fewer shutdowns.

The line of Danly Underdrive Presses below is headed by a Triple Action Danly that actually doubles production. Eliminating what is normally a choke point, this Danly draw press is equipped with a special slide motion that permits faster stroking without exceeding safe drawing speeds. The output from this press keeps the whole line of secondary operation presses working steadily at full capacity.

At the left is another line of Danly Presses headed by a top drive double action draw press. This line represents the most advanced thought in press engineering. Totally enclosed and integral controls make installation practically a "plug-in" job. Operation is easier, safer—less maintenance is required.

All Danly Presses are built heavier to stand up under continuous peak load operation. Automatic oil lubrication adds hours of production time to every working day. No matter what your stamping requirements are, Danly Presses will reduce your costs. Call a Danly press engineer today.

DANLY MACHINE SPECIALTIES, INC.
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Danly Underdrive presses like these are the new answer to mass production of large stampings . . . they double output of the entire line, require less floor space and are designed especially for automation.

DANLY

Saws Spell Opportunity

Jessop Steel took a chance. Now it's beating foreign competition at its own game

A CALCULATED RISK is paying big dividends for Jessop Steel Co. in a specialty market that was dominated by European manufacturers. In mid-1952, Frank Rackley, Jessop's president, decided his company could provide the American saw industry with hardened and tempered, ground and polished steel of the type sawmakers were importing.

Result is that Jessop counts among its customers the largest sawmakers in the U. S. Aside from band saws, the steel is finding applications in scraper blades, cane and corn knives, grain hammers and inking blades.

Technological advances and production efficiency overcome labor and material cost advantages enjoyed by European manufacturers. Customers also appreciate the ability to fill an order in days instead of weeks.

Careful Control—Production requires close control of physical properties, gage, camber and degree of flatness. The semicontinuous production line turns out 1300 lb per hour. Facilities include hardening and tempering furnaces, quench tank, hardness check, belt grinders, parallel edge grinders and a final inspection table.

SAW STEEL FINISHING
. . . belt-ground within 0.002-in.

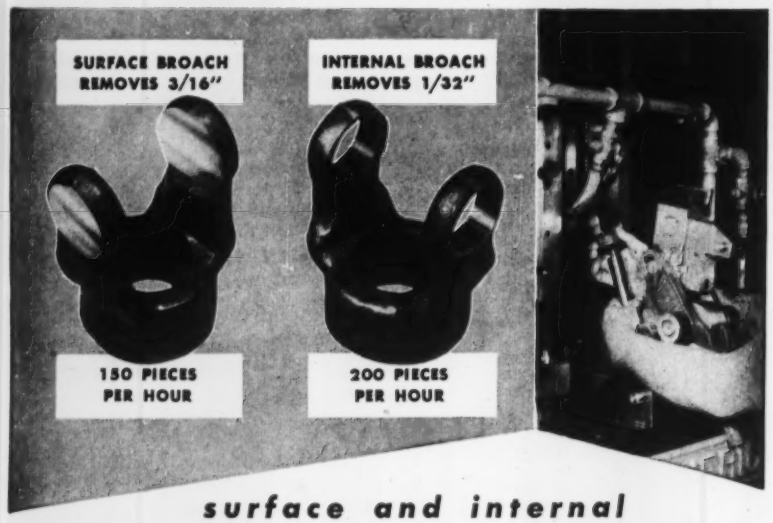
Hot rolled strip is hardened in a gas-fired furnace at speeds from two to eight fpm, depending on gage. Then it is oil quenched at 1500 F and oil and scale is removed as strip passes through a cleaning box before entering the tempering furnace.

Further Processing — Steel next passes under a Jessop-designed dead weight water-cooled platen, which acts as a simulated quench and additional flattener. Following hardness and flatness tests, the strip is belt ground on both sides to a tolerance of plus or minus 0.002 in.

Next Week in STEEL

No. 11 in STEEL's Modern Heat Treating series will be a management checklist on just what can be accomplished with controlled atmosphere heat treating. It will answer the question, "Am I taking full advantage of latest developments?"

one American broaching machine



surface and internal broaching possible with American 3-way machine

To broach the lugs and cross holes of a universal joint, American engineers designed a combination tooling set-up on a standard American T-10-36 3-way machine.

Arranged with 3 stations, the machine surface broaches 3/16 stock off the inside and outside surfaces of the lugs at the center station; or broaches 1/32 off the I. D. of the lug cross holes at the two outer stations.

For more information on your particular broaching problem send a part-print or sample and hourly requirements. Address Dept. S.

For more information on American Machines send for Catalog 3300.

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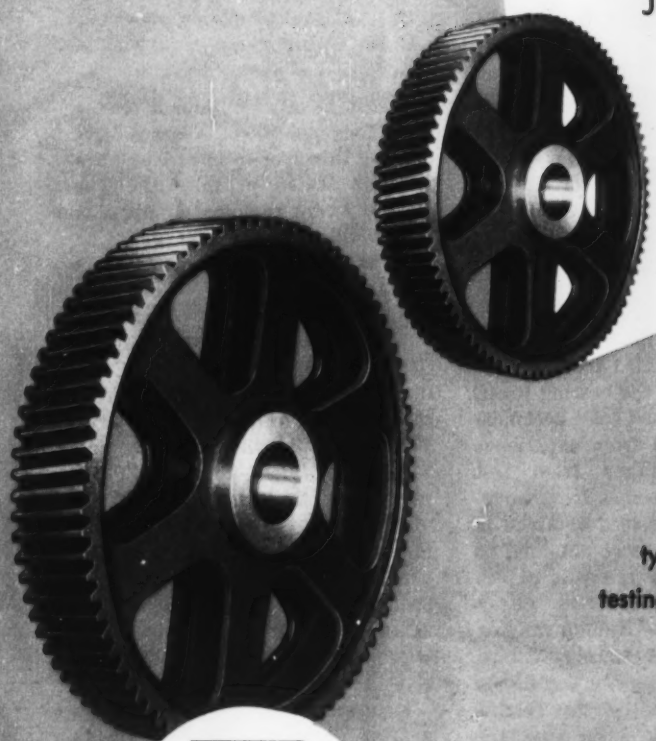

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Fig. 1

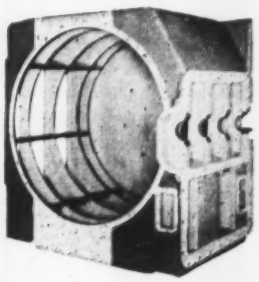


Fig. 2

Casting makes it possible to obtain shapes not economically possible with other methods of forming. Contours can be followed exactly, eliminating much machining. Fabrication of parts like that in Fig. 1 usually can't be done without difficulty. In repetitive production of complex shapes, casting is usually economical. The housing in Fig. 2 cost $1622 to make as a weldment; the casting cost $1400. Of course, you must weigh each case carefully. Many examples can be cited where weldment is the cheaper

Choice of Material Is Vital

By T. E. EAGAN
Chief Research Metallurgist
Cooper-Bessemer Corp.
Mt. Vernon, O.

Your success with castings in service depends on knowledge of materials. Here's an analysis of the ferrous types to consider and the specifications that cover them

CASTING is the most direct way to shape metal into usable form. Simple in origin, the process is one of the most efficient ways you can give form to structures used in machine design.

It's logical that a casting should be among the first considered by designers. The choice hinges, of course, on mechanical properties needed and the cost of production.

Material Selection — When you decide to use a casting, your choice of material is vital. First question is whether to use a ferrous or a nonferrous material. Generally, this is easy. Each metal has some quality that points the way.

For example, aluminum and its alloys usually are used for their lightness and strength, copper alloys for corrosion resistance and bearing qualities. Usually, cost of the metal will influence its use.

The ferrous metals discussed are those considered for engineering service requirements: Cast steel (general engineering grades), S.G. iron (nodular iron), malleable iron and gray iron. The list is in order of relative strength.

Physicals are presented comparatively where possible.

Properties — The term physical properties is used advisedly; generally, mechanical properties should cover this field. However, there's some desire to cover other properties that can be of service to the designer.

Three tensile values interest designers. One is the minimum; second are the ones he would be most likely to obtain; third are the physical properties of the casting itself. The first is obtained from specifications; the second from experience (results being taken from test bars); the third comes from correlation work on results obtained in the test bar and those obtained on the casting. The latter is expensive and difficult.

Specifications — Among the several specification-making bodies, the one most generally considered is the American Society for Testing Materials. Limits in its specifications for the ferrous metals are given in Fig. 3.

For steel castings, there are two general specifications. A27, "Mild to Medium Strength Carbon Steel Castings for General Application" (tentative) covers eight different classes. Three of these, N-1, N-2 and N-3, have no minimum tensile properties specified. Classes covered by this spec in most cases are used as stated in the title. The classes where chemical analysis is specified usually are expected to be used in weldments. Class N-3 is an exception.

Specification A148 covers higher tensile property cast steel and is titled "High Strength Steel Castings for Structural Purposes" (tentative). Fig. 3 shows a range from 175,000 psi tensile strength and 145,000 psi yield point to 80,000 psi tensile strength and 40,000 psi yield point. No chemical requirements other than a maximum 0.05 per cent phosphorus and 0.06 per cent sulphur are specified. This allows a foundry the greatest leeway possible in the choice of alloys to meet requirements.

Discretion—Heat treatment—annealing, normalizing, normalizing and tempering, quenching and tempering—is mandatory. But the foundry can choose the type.

Because the range of properties given in this specification is so wide, classes over 105-95 should be used with discretion. Take into account machinability and other properties

Table I

Expected Range of Tensile Properties for Two Classes of Steel Castings

Specification A27, Class 65-30

	Tensile Strength psi	Yield Point psi	Elongation %	Reduction of Area %
Required (Minimum)	65,000	30,000	20	30
Supplier A	70,000-80,000	33,700-58,900	26-34	43-57
Supplier B	70,000-87,000	39,500-58,300	24-33	39-59
Supplier C	72,600-90,600	30,600-49,800	22-32	28-50*

Specification A148, Class 80-50

	Tensile Strength psi	Yield Point psi	Elongation %	Reduction of Area %
Required (Minimum)	80,000	50,000	22	35
Supplier B	90,000-106,000	60,000-88,000	20-30	45-69

* Results shown for Supplier C are taken from cast-on coupons.

Table II

Probable Values Obtainable in Malleable Iron
Specification A47

	Grade 35018	Grade 32510
Tensile Strength, psi.	57,000	50,000
Yield Point, psi.	37,500	32,500
Elongation in 2"	22%	14%

Cast Metals Handbook

not touched by the specification.

S.G. Iron — ASTM Specification A339 recently has been issued to cover this material. This spec covers two grades of material, as-cast 80-60-03 and ferritizing annealed 60-40-10. The former calls for a minimum tensile strength of 80,000 psi, 60,000 psi yield strength and 3 per cent elongation. The latter calls for minimum 60,000 psi tensile strength, 40,000 psi yield strength and 10 per cent elongation.

At present, only these two grades are recommended. But you can obtain even higher tensile properties by special heat treatment.

They are in such a state of change that specifications are difficult to write. A few specs issued privately for S.G. iron vary somewhat from A339, mostly in minimum elongation requirements.

Malleable Iron — There are three specifications for this material. A47 and A197 cover what is known as malleable iron. A47 covers the two best grades, requires melting in electric or air furnace or a modification of these, as distinguished from the cupola melted material covered by A197.

The Malleable Founder's Society recommends A47 almost exclusively because A197 actually is intended for such things as pipe fittings. These three grades of material have lower physical properties than S.G. iron.

A220 deals with pearlitic malleable irons. Grade numbers represent minimum yield strength and elongation; however, each grade requires a minimum tensile (Fig. 3).

Malleable Limitations—There are some marked limitations in the use of malleable iron. For example, it must be cast as white iron and heat-treated through a rather long cycle. This limits practical section thicknesses.

Malleable iron is being cast in sections from 1/16 in. or less to 2 in. or more. Generally, you'll find that a metal thickness of 3/16 or ¼-in., with strengthening ribs well designed and properly located, is practical. For castings of medium size, a section of ½ to ¾ in. also is practical. The thinness of section that can be cast effectively in malleable iron depends on the design of the part and the type of pattern equipment used. Quality patterns are vital on intricate thin-section castings. They should be made without cores.

White malleable iron lends itself to mechanized foundry production. We have always experienced difficulty obtaining small quantities of any one item. But the Malleable Iron Founder's Society claims it can be done. They report a substantial number of foundries are producing small quantities.

Gray Iron — Specification A48 covers all engineering grades of gray iron, including the alloyed grades. Exceptions are the so-called austenitic matrix types. It is a relatively simple specification calling for classes that represent minimum required tensile strength in a specified test bar.

Classes range from 20,000 to 60,000 psi. Neither chemical analysis nor heat treatment is specified. Proper choice requires more information than you find in specifications.

Most Likely Physicals — Minimum required tensile properties appear in the specs. But to meet requirements, properties actually obtained always are higher.

You'll find two factors significant: Actual range of tensile properties you can expect from the test bars, and a correlation of these properties with those actually found in the casting. The latter is the most important.

Results—Table 1 shows test results on cast steel—separately cast test blocks and cast-on bars from A27, class 65-30; and from A148, class 80-50. Physicals from separately cast test bars are well above the specified minimum. But with cast-on test bars, you can obtain some tests with elongation and reduction of area slightly lower than those from separately cast test bars.

With S.G. iron, the as-cast condition is sensitive to section thickness, making expected tensile properties difficult to predict. It has been shown that for the 80-60-05 grade—comparable to 80-60-03 in ASTM Specification A339—these properties are attainable: Tensile strength, 85,000 to 95,000 psi; yield point, 65,000 to 70,000 psi; and elongation, 5.5 to 7.0 per cent.

Generally, heavy casting producers experience no elongation. However, some manufacturers get elongations up to 10 to 15 per cent from test bars taken from 1-in keel blocks.

You can probably meet the tensile strength and yield point re-

96 Inch Heavy Duty
Betts-Bridgeford Lathe

CONSOLIDATED MACHINE TOOL

Wholly owned subsidiary of Farrel-

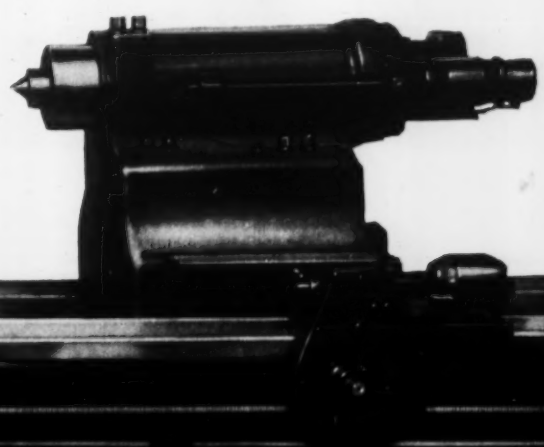
You Can Run This BETTS-BRIDGEFORD LATHE AT THE CUTTING TOOLS!

All of the feeds and all of the 20 to 1 range driving motor speeds are electronically selected and controlled at the cutting tools! Both are infinitely variable and can be changed in fine increments while the tools are cutting!

Push buttons on the control panel traverse the carriage right or left and the tools in or out.

Only for thread cutting or shifting in or out of the face plate drive, does the operator have to leave his working position at the cutting tools.

CONSOLIDATED MACHINE TOOLS



CORPORATION, ROCHESTER, N. Y.

Birmingham Company, Incorporated

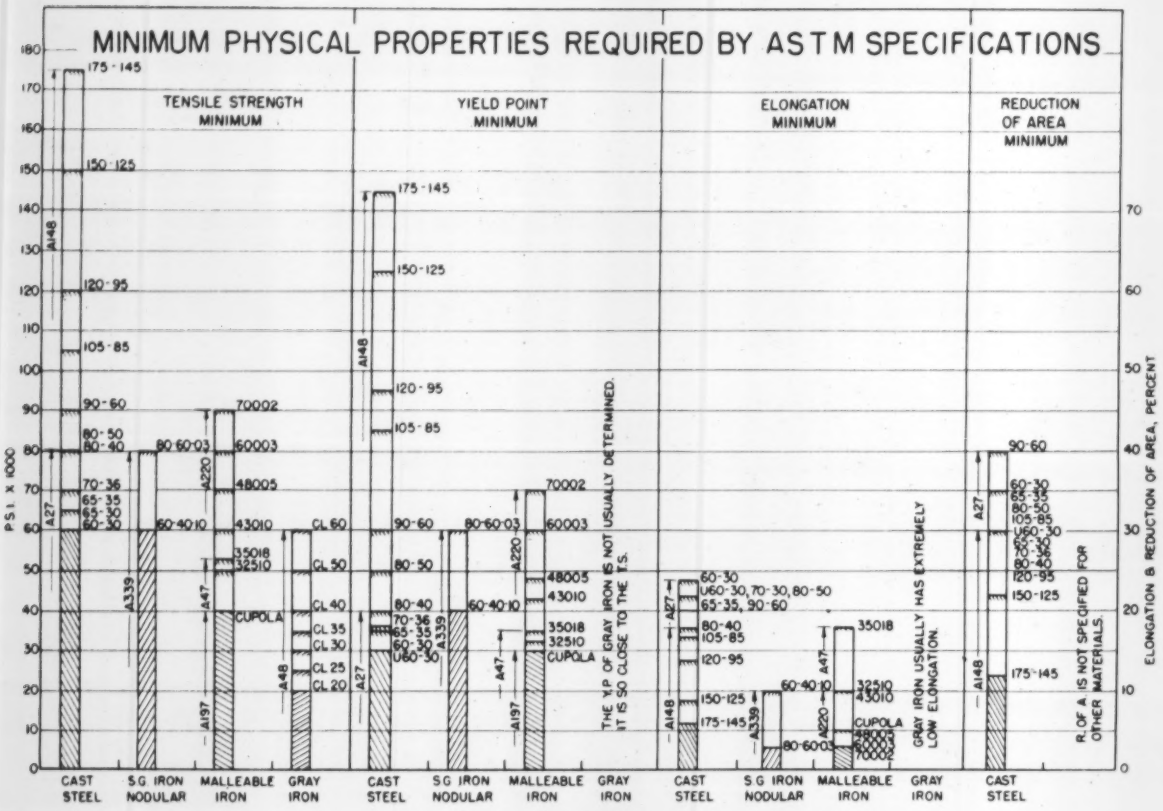

MINIMUM PHYSICAL PROPERTIES REQUIRED BY ASTM SPECIFICATIONS
TENSILE STRENGTH MINIMUM
YIELD POINT MINIMUM
ELONGATION MINIMUM
REDUCTION OF AREA MINIMUM
P.S.I. X 1000
ELONGATION & REDUCTION OF AREA, PERCENT
CAST STEEL
S.G. IRON NODULAR
MALLEABLE IRON
GRAY IRON
THE Y.P. OF GRAY IRON IS NOT USUALLY DETERMINED. IT IS SO CLOSE TO THE T.S.
GRAY IRON USUALLY HAS EXTREMELY LOW ELONGATION.
R. OF A. IS NOT SPECIFIED FOR OTHER MATERIALS.

Fig. 3—Chart covers specifications under discussion. ASTM specification number is given at left of the bar and the various grades or classes are given at right

quired for the as-cast grade. But there is some doubt that elongation of even 3 per cent can be met consistently. One example: In a series of 225 heats made and annealed in one of our foundries we found: Tensile strength, 64,400 to 76,000 psi; yield strength, 43,700 to 65,300 psi; and elongation, 14.7 to 20.3 per cent.

These tests were taken from 3-in. Y blocks. Expected tensile properties for A47 for malleable iron are outlined in Table 2. No information of this nature is available on pearlitic malleable iron, Specification A220.

Section Sensitive—Gray iron is extremely section sensitive. Specification A48 recognizes this by requiring that the manufacturer and the purchaser agree on the controlling section of the casting. Then the diameter of the test bar is chosen. The 1.2 in. diameter is most popular and often is used to cover all casting section thickness. This is not objectionable if the section sensitivity situation is understood.

The most probable value obtained for each grade of gray iron always will be above that required if the proper diameter test bar is used to represent the section or sections of the casting. But you can't give an exact table that applies accurately to all foundries. Tensile strength will be between the minimum and 10,000 psi above that minimum.

Because gray iron is a nonductile material, its yield point is so near tensile strength that it is never given; nor is it usually obtained on test. There's little or no elongation in this type material.

This is the first of four articles on the cast ferrous metals by Mr. Eagan. In succeeding issues of STEEL, he will discuss relative strength of cast metals in engineering uses. Service requirements, castability, machinability and some of the characteristics unfavorable to use of castings will also be covered.

As chief research metallurgist at Cooper-Bessemer Corp., Mr. Eagan headed the company's development work in high-strength irons and—more recently—in perfecting techniques for casting S.G. (nodular) iron. Much discussion is devoted to pegging the position of nodular iron among the cast metals.

Mr. Eagan is a past national director of the American Foundrymen's Society. Before his affiliation with Cooper-Bessemer in 1934, he held positions with Simonds Saw & Steel Co., Crucible Steel Co. of America and Midvale Co.

The author's most recent honor was the Joseph S. Seaman Gold Medal, awarded by the AFS at its 58th annual convention this year in Cleveland.

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FORMED CUTTERS

designed for peak milling efficiency, consistent form duplication, accuracy and long cutting life

Cutters specially designed and manufactured for your form milling operations give you greater cutting efficiency, the most practical means of combining cuts, and reduced milling costs. Depending upon the accuracy you require, these cutters can be furnished with either ground or unground form.

Barber-Colman uses new manufacturing controls and production equipment to give you the most accurate, long-lived formed milling cutters available.

For your special form milling requirements, call a Barber-Colman cutter specialist. He will be glad to assist you with your particular production needs.

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GENERAL OFFICES AND PLANT, 8811 ROCK STREET, ROCKFORD, ILLINOIS

Specialists in

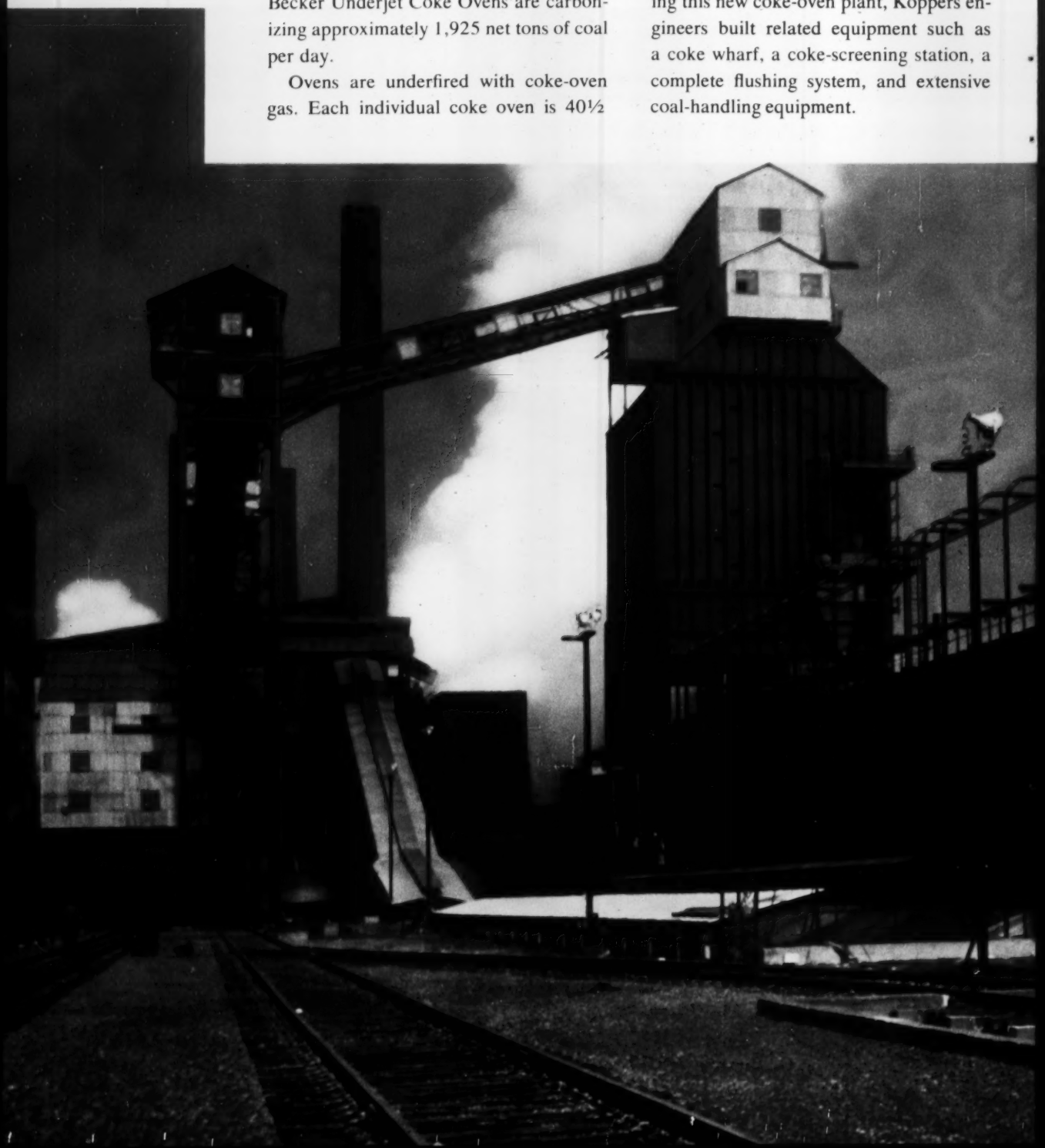
milling cutters, profile or formed, ground or unground thread milling, special problems

Jones & Laughlin

For J&L's Hazelwood Plant in Pittsburgh, Pennsylvania, Koppers engineers recently completed the construction of this new battery of 79 coke ovens. These Koppers-Becker Underjet Coke Ovens are carbonizing approximately 1,925 net tons of coal per day.

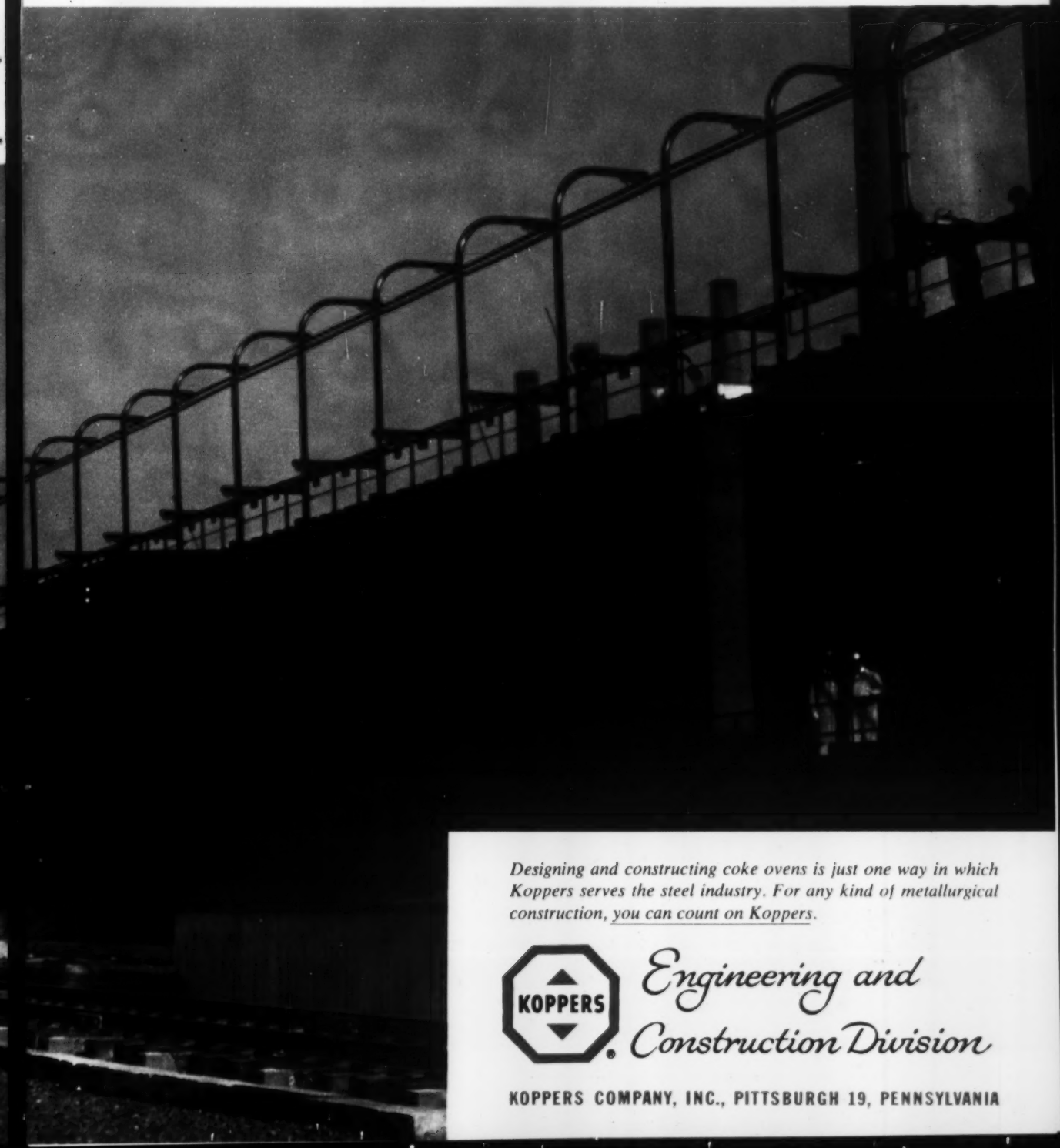
Ovens are underfired with coke-oven gas. Each individual coke oven is 40½ feet long, 13 feet high and 17 inches in average width. All ovens are equipped with Koppers Self-Sealing Doors.

In addition to designing and constructing this new coke-oven plant, Koppers engineers built related equipment such as a coke wharf, a coke-screening station, a complete flushing system, and extensive coal-handling equipment.



Koppers builds a new battery of 79 Koppers-Becker Coke Ovens

J & L's new battery of Koppers-Becker Underjet Coke Ovens. These 79 ovens are carbonizing approximately 1,925 net tons of coal per day.



Designing and constructing coke ovens is just one way in which Koppers serves the steel industry. For any kind of metallurgical construction, you can count on Koppers.

KOPPERS

Engineering and Construction Division

KOPPERS COMPANY, INC., PITTSBURGH 19, PENNSYLVANIA

This simple idea saves money in V-Belt Costs

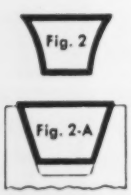
You can prove it in two minutes!

To prove how the CONCAVE SIDES of GATES VULCO ROPES *save money*, just make this simple test—

Bend *any* V-Belt that has *straight sides* (Fig. 1) and—as the belt bends—*feel* the sides *bulge out* (Fig. 1-A). This out-bulge concentrates the wear at the points shown by arrows—and this naturally shortens the life of a *straight-sided* belt!

Now bend a Gates Vulco Rope with CONCAVE SIDES (Fig. 2)

(U. S. PAT. 1813698)



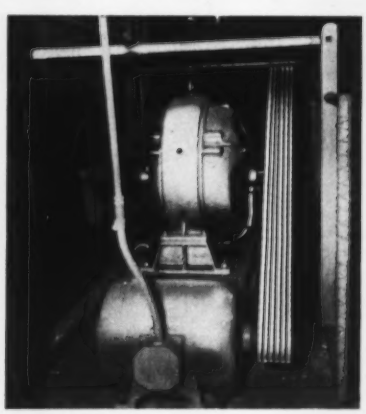
You find that the CONCAVE SIDES *fill out* and become perfectly straight. They thus press *evenly* against the V-pulley. All wear is distributed *uniformly* across the *full width* of the GATES VULCO ROPE—and this means *longer* belt *life* and *lower* belt *cost* for you!

When you buy V-Belts, be sure to get the V-Belt with the CONCAVE SIDES—the GATES VULCO ROPE!

VULCO ROPE DRIVES

THE GATES RUBBER COMPANY
DENVER, U.S.A.

Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.



Typical Gates Vulco Rope Drive—the Gates V-Belts are built with Concave Sides to insure longer belt wear.

CS-949

Anode Plate Protection

New aluminum alloy may be a protector for some tough metal corrosion areas

SPECIAL aluminum alloy designed primarily for cathodic protection of steel ship hulls in sea water, Alcoa anode plate provides sacrificial electrodes that relieve galvanic attack on the hull.

Other potential applications: Protection of heat exchangers, storage tanks, various types of condensers and small metal-hulled boats.

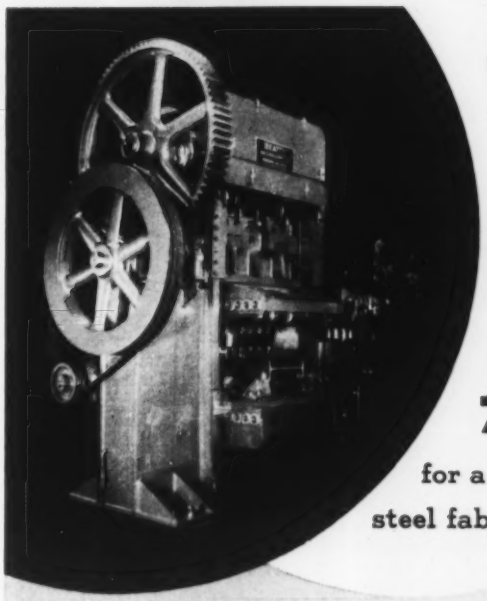
First Tests — First installation was made in January, 1953. Thirty-eight anodes cut from the anode plate, were bolted to the hull and rudder post of the *SS Alcoa Clipper*. When the ship was drydocked in August the same year, the steel on the stern frame, rudder post and rudder had retained its entire coat of paint. There was no indication of severe corrosion-erosion attack.

Initial inspection revealed that the aluminum anodes were half

ALUMINUM ANODE PLATE
. . . complete underwater protection

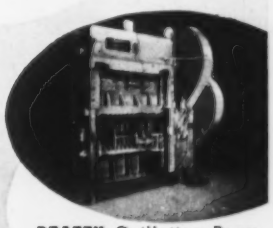
consumed. In January, 1954, after a year of continuous service, the anodes had been consumed to the point that they were ready for replacement. This later inspection showed that the same excellent condition still existed around the stern of the ship as revealed in the earlier inspection.

The plate is made in one standard size, 1 x 36 x 96 in. and can be cut into any desired size for installation.

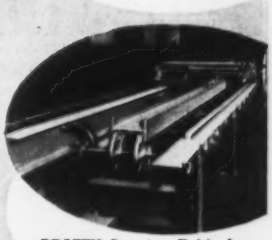


This Beatty Punch CUT COSTS 75% for a structural steel fabricator

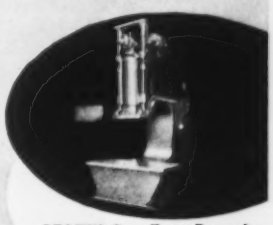
One of our present-day satisfied customers formerly employed machinery using only one punch for punching structural steel shapes. After consulting a BEATTY engineer, this firm installed a BEATTY Guillotine Beam Punch with an adjustable tooling feature that enables them to perform exact repeats of multiple punch patterns in 25% of the time formerly required. Naturally, we can't guarantee such substantial savings in every industrial installation of BEATTY machines! But, if you're currently considering additional production machinery for your metal fabricating plant, better see a BEATTY engineer before making any final decisions! Chances are he'll have an idea or two on how you can achieve greater production economies with BEATTY Machines!



BEATTY Guillotine Beam Punches are available for punching webs and flanges in "I" beams from 6" to 30".

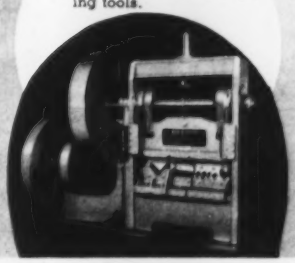


BEATTY Spacing Table handles web and flange punching without roll adjustment.



BEATTY Gap Type Press for forming, bending, flanging, pressing. Capacity 250 tons.

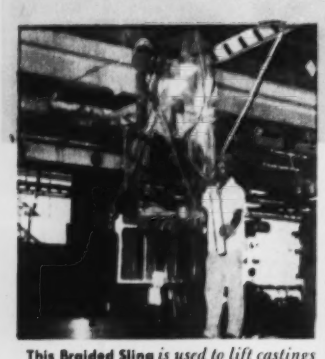
BEATTY
Guillotine Bar Shear for angles, bars, rounds, squares without changing tools.



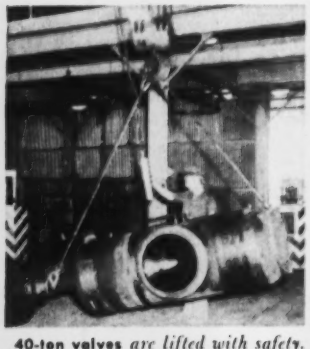
BEATTY
Machine & Mfg. Company
HAMMOND, INDIANA

WKM Mfg. Co.
• INSURES SAFETY
• INCREASES OUTPUT
WITH
YELLOW STRAND
SAFETY BRAIDED SLINGS

From raw stock to finished product, huge control valves produced in the Houston plant of WKM Mfg. Co. are handled with Yellow Strand Braided Safety Slings. These slings have helped the company reduce accidents and increase per-man production.



This Braided Sling *is used to lift castings into position for machining. Lighter in weight, the slings are easily carried from bay to bay.*



40-ton valves *are lifted with safety. The slings give ample warning of fatigue and can be easily renewed. Flexibility makes attachment of sling faster, surer.*

YOU CAN DO THE SAME!
Yellow Strand
Braided Safety Slings
BRODERICK & BASCOM ROPE CO.
4203 Union Blvd. • St. Louis 15, Mo.

MACHINE TOPICS

By R. F. HUBER, *Machine Tool Editor*

EASILY one of the best engineered machine tools to hit the market, Bullard's new model 75 vertical turret lathe is a far cry even from its immediate predecessor.

Introduced a little over a week ago, the machine is the epitome of centralized control. Key to the machine's operation is a pendant control that may well set a trend all its own.

Gear Shifts—A unique hydraulic shifter unit makes it possible to control all functions of the machine from the pendant. Design of the pendant is also unusual in that it utilizes levers instead of push buttons.

Advantage is that there is a direct correlation between the action of the lever and the machine function accomplished. Thus, push the turret feed lever to the left and the turret moves in that direction. The same lever controls feed of the turret right or left, up or down.

Angle Motion — The only other lever for controlling motion of the turret works identically to the feed lever, but is for rapid traverse.

By twisting a little guide plate, you can get a combination of feed and traverse to 45 degrees in any of the four directions.

Speeds and Feeds—Dials on the side of the pendant set feed and speed rates. Mechanical interlocks prevent engaging of rapid traverse of a head while it is feeding and it's impossible to change the feed while the locking lever is engaged.

The pendant swings 180 degrees around the front of the machine, and it can be raised and lowered (by power) to put it at the most convenient location for the operator.

And More—Besides the new pendant control, the new machines feature a cleaned-up appearance that puts them definitely in the 1955 class. Most of the shafts, gears, and wires are enclosed, and the castings have been rounded off and generally streamlined.

Discussing the design program which resulted in these machines, F. U. Hayes, vice president-sales manager, cites as the main objectives: Centralized controls for ease of operation, more accuracy, more productivity and improved appearance.

While the new vertical turret lathe is now ready, the redesign program continues. Other developments are still in the works.

The new machine, incidentally, is called the model 75 in honor of the company's 75th anniversary coming up next year.

Sectionized Automation

Production losses during downtime take a beating from this Cross Co. development. It's based on division of a machine into sections so you can shut down some operations without interrupting others.

First application is made on a 555-operation, 350-ft-long Transfer-matic. It's divided into five sections so one can be shut down for tool change or minor repair without halting the others. Work in the down section catches up during a lunch hour or extra shift, if necessary, since any section can run independently with full automatic cycle.

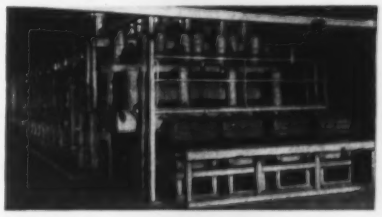
How to Select the Most Economical Insulating Firebrick

The advantages of lightweight insulating firebrick over ordinary "heavyweight" firebrick are generally known to furnace operators and furnace builders. But many buyers have wondered just what advantages there might be in one brand of insulating firebrick as against another. The answer to this question could very well mean savings in fuel costs, increased furnace output, longer life . . . or all three.

One furnace builder ran tests on their small electric kilns where heat input could be measured with great accuracy. Here's what they found: B&W IFB required 25% less heat than any other brand of insulating firebrick they tried.

The reason? B&W IFB are lighter in weight than any other insulating firebrick — they contain more tiny, insulating air cells. Heavier, denser insulating firebrick linings waste fuel two ways: They soak up and store more heat which is lost when the furnace is cooled; and they conduct more heat through the walls.

How about long life? One of the



toughest tests of firebrick is in the lining of a carbon monoxide furnace. Some brands last only a few weeks, then disintegrate, due to iron oxide impurities in the brick which react with the gas.

But B&W Insulating Firebrick contain little iron oxide, and they're processed at high temperatures so that any traces of iron oxide form stable compounds. So instead of deteriorating they stay on the job year after year —in many cases over 10 years.

Another factor, important to many furnace operators, is accurate temperature control. Here again B&W IFB have an advantage over other insulating firebrick. First, because B&W IFB are lighter in weight they store and conduct less heat—and they respond more quickly to changes in heat input.

A typical example is the giant stress-relieving furnace shown below—sixty feet by twenty-two feet by seventeen feet high. The B&W lining plays a vital part in holding the desired temperature within 5 degrees accuracy!

Next time you buy or specify insulating firebrick, remember that the lightest weight brick of all—B&W—has the highest insulation value, the longest life and the greatest furnace heat controllability.

THE BABCOCK & WILCOX CO.
Refractories Division
General Offices:
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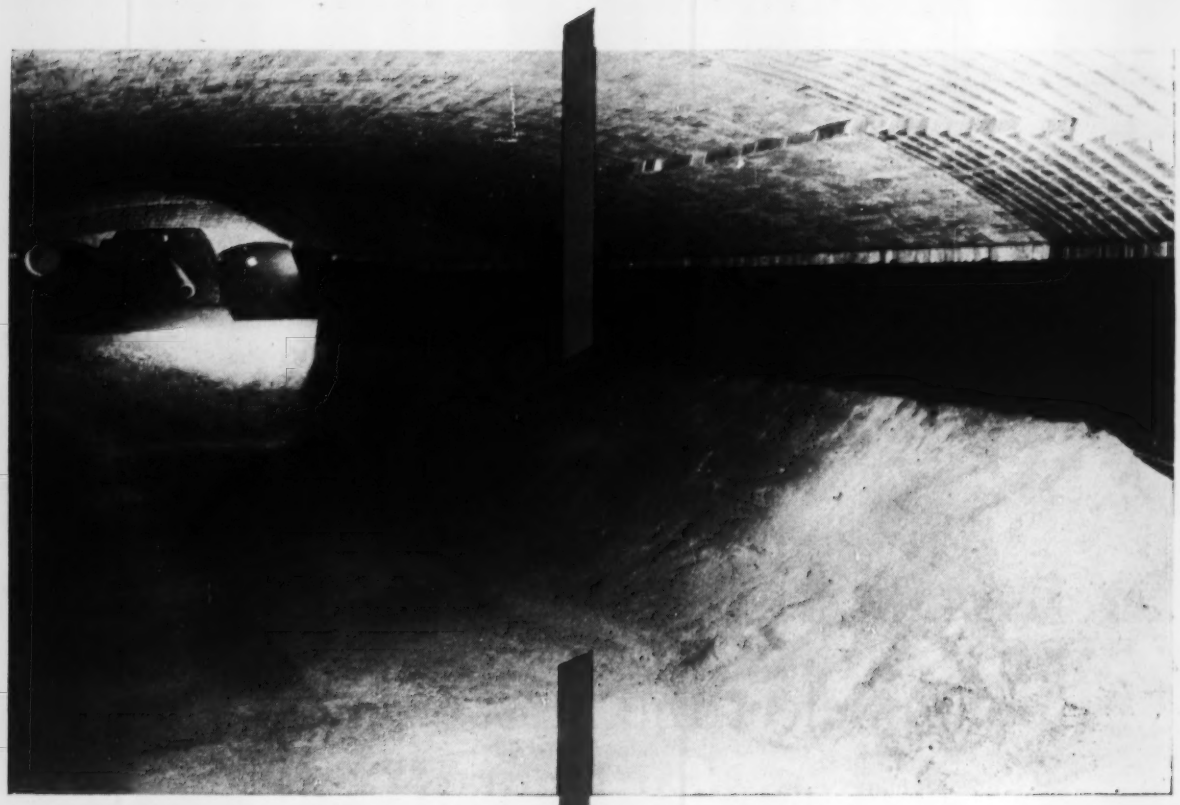
(Advertisement)

R-919



HARBISON-WALKER

Announces

H-W C-MIX

(Seawater Magnesite Mixture)

A NEW 92% Magnesia Ramming Mixture for open hearth furnace bottoms

- **HIGH STRENGTH**
  Over 4000 psi crushing strength after heating to 2910°F.
- **HIGH DENSITY**
  172 lb. per cu. ft. (rammed)
- **LOW SHRINKAGE**
  Less than 1% when reheated to 2910°F. (ASTM C 113-46)
- **MADE FROM HIGH-PURITY SEAWATER MAGNESITE**

HARBISON-WALKER REFRACTORIES COMPANY
AND SUBSIDIARIES
World's Largest Producer of Refractories
GENERAL OFFICES **PITTSBURGH 22, PENNSYLVANIA**

Heavier Role for X-Ray

GE's Dr. Charlton sees higher voltage x-ray, smaller, less-complicated betatrons

BRIGHT future for high-energy x-rays in combination with image intensifier systems for inspection is predicted by Dr. Ernest E. Charlton. Dr. Charlton is consultant in nucleonics and radiation at the General Electric research laboratory in Schenectady.

He delivered the Mehl Honor Lecture at the annual convention of the Society for Nondestructive Testing Inc., on "High-Voltage Sources for Industrial Radiography: Past, Present and Future Trends."

The Future—Looking to the future Dr. Charlton says new principles of multisection tube design incorporating new materials make it possible to predict a high-voltage x-ray generator that could be built to operate at 4 million electron volts (Mev) and would not be a great deal larger than existing 2 Mev mobile x-ray unit.

"By the same token, we see no inherent design obstacles in building high-voltage radiation sources of this same basic design for operating voltages of 8 Mev."

The Betatron — Dr. Charlton feels the betatron has high potential for further design improvements that will make it smaller, less complicated, more efficient and less costly. Traveling-wave linear accelerators, in which electrons ride a high-frequency wave in a straight tube, also look like attractive high-energy radiation sources because of their potential advantages in small size and weight.

He pointed to the betatron as offering a radically new approach to the problem of designing a mobile machine capable of generating still more penetrating x-rays than resonance transformer units, for application in high-voltage radiography. This opens the door to generation of electrons and x-rays with energies of hundreds of millions of volts. It offers, for example, the use of high-energy x-rays for making radiographs on motion picture film of machinery under actual operating conditions.

Radioactive Elements — Speaking of radioactive elements, he asserted these will find their principal application in fields of nondestructive inspection where information is recorded on automatic electronic devices, rather than on a photographic film or a fluoroscopic screen.

"New detectors employing photo-emissive and photo-conductive materials, now being extensively studied in solid-state physics, may come to play significant roles in recording and transmitting the data picked up through x-ray.

Waste Analyzation

Procedures for analyzing metal-finishing wastes are outlined in a manual published by the Ohio River Valley Water Sanitation Commission in co-operation with its Metal-Finishing Industry Action Committee.

Priced at $1.00, it may be obtained from the commission at 414 Walnut Street, Cincinnati 2.

Send for FREE *Florida* Information Kit

Industrialists and businessmen considering plant location, relocation, regional branch plants, offices and warehouses will find this kit a source of valuable guidance. Ten new solidly factual folders, conveniently packaged in a tabbed file cover, present what you need to know before selecting your location.

For your copy, write: State of Florida, Industrial Development Division, 3408C Caldwell Building, Tallahassee, Florida.

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MARKET · NATURAL RESOURCES · TRANSPORTATION
EDUCATION & CULTURE · POWER · LABOR · RESEARCH
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Plan national sales conventions, sales conferences and state and regional meetings for Florida. Exceptional facilities for any type of meeting. Get double value . . . successful meetings in delightful surroundings plus colorful recreational activities.

you'll always do better in

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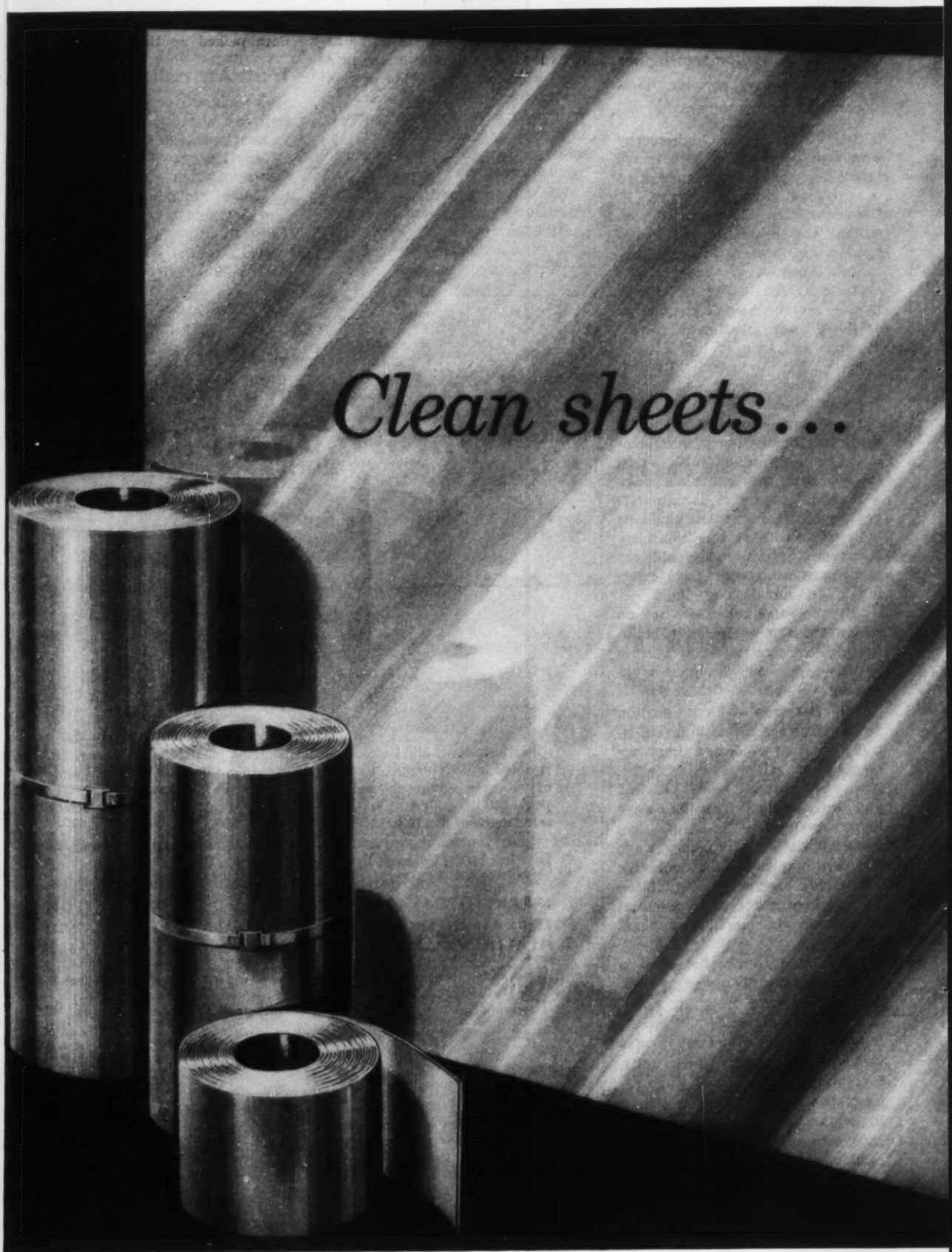

Clean sheets...

make better products

Clean is the word for Chase Brass Sheet and Strip—it's always bright...smooth...free from oxide coating and excess oils. It's always straight and smooth on the edges, too—and uniform in width, gauge, temper. For *you*, that means *higher* product quality...*lower* finishing costs. The fact is, Chase® sheet metal saves you money all along the line. Its high ductility and malleability make for easier, faster forming, longer tool life. It's *so* workable, it often allows you to combine forming processes without intermediate annealing steps.

Chase®

BRASS & COPPER CO.

WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

For the *finest* in sheet brass, bronze or copper—get in touch with your Chase wholesaler or the nearest Chase warehouse. And remember—Chase now sells stainless steel, too!

NEW PRIZE-WINNING MOVIE—"*The Science of Making Brass.*" Available for free showing in your plant or office, or to industry groups. Call nearest Chase warehouse or write us.

The Nation's Headquarters for Brass & Copper (†sales office only)

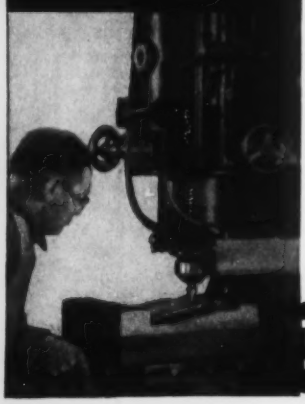
Albany†	Chicago	Denver†	Indianapolis	Minneapolis	Philadelphia	St. Louis
Atlanta	Cincinnati	Detroit	Kansas City, Mo.	Newark	Pittsburgh	San Francisco
Baltimore	Cleveland	Grand Rapids†	Los Angeles	New Orleans	Providence	Seattle
Boston	Dallas	Houston	Milwaukee	New York	Rochester†	Waterbury

T-J toughness

means more work between grinds...

LOWER DIE COSTS!

This T-J Cutter at work on a connecting-rod die block for a board drop hammer. Material being milled is "Hardtem" die steel. A cutter of right design and heat treatment for this high speed work in tough die steels, making possible maximum efficiency of these machines.



LARGEST SELLING CUTTERS FOR TOUGH DIE STEEL

Be sure of *top performance* in die sinking milling cutters . . . specify T-J! They're preferred everywhere today in die and forge shops . . . because T-J Cutters are *extra sturdy* . . . you can raise the feed!

Designed for speed, accuracy and long life . . . hold a sharp edge longer on job after job . . . less breakage! Made from an extremely high grade steel . . . properly machined . . . scientifically heat-treated and accurately ground. Wide range of styles and sizes to *reduce your* die costs. Send for new catalog 4-153. The Tomkins-Johnson Co., Jackson, Michigan.

38 Years Experience

FOR TOUGH JOBS SPECIFY T-J

TOMKINS-JOHNSON

RIVITORS AIR AND HYDRAULIC CYLINDERS CUTTERS CLINCHORS

Heavy Presses Grow

Two of the much-publicized heavy presses in the U.S. Air Force program will soon be completed. These are the 50,000-ton unit being built by Mesta and the 35,000-tonner handled by United Engineering & Foundry Co. at Alcoa's Cleveland Air Force plant

New Aluminum Isotope

Now you can apply tracer techniques to aluminum. Until the discovery of aluminum 26 at Carnegie Tech, the metal's radioactive isotopes were confined to those with a half life of only a few minutes. The new isotope has a half life of about a million years.

It can be used to study the properties of aluminum and its chemical compounds, and new information can be gained about the processes by which aluminum is formed.

Aluminum 26 has long been known in a form having a half life of 6 seconds. The new form was found in work under AEC grant.

Carbide Stamps Show Strength

Cemented carbides, used as marking stamps for table and kitchen cutlery blanks, are giving wear life ten times that of former stamps—and are still going strong after a year's use.

According to John Hull Cutlers Corp., Meriden, Conn., which has been keeping accurate records of the performance of two Carboloy grade 55B carbide stamps, one is in excellent shape, and gives no indication of wearing. The other developed a slight chip.

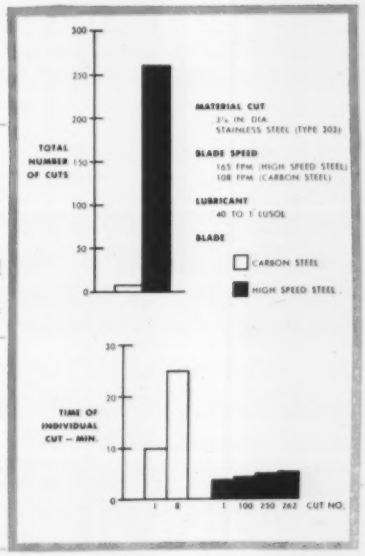
Why Moly alloy steels are in your future

CUTTING LIFE INCREASED 10 TIMES

with

Moly *tool steels*

the part	**BAND SAWS**
the problem	Carbon-steel band-saw blades are usually made of a tool steel with about 1.25% C. For normal usage band saws make smoother and straighter cuts than hack saws. However, normal band saws run into difficulties when they're used as cut-off saws for materials with different machining properties.
the pay-off	The Henry G. Thompson & Son Company developed a moly high-speed steel, cut-off band-saw blade for stainless steel and other materials on a production basis. The chart shows graphically the results: cutting life of saw increased, time per cut shortened.



If you make, use, specify or buy steels you need a copy of "ALLOY STEELS PAY OFF"

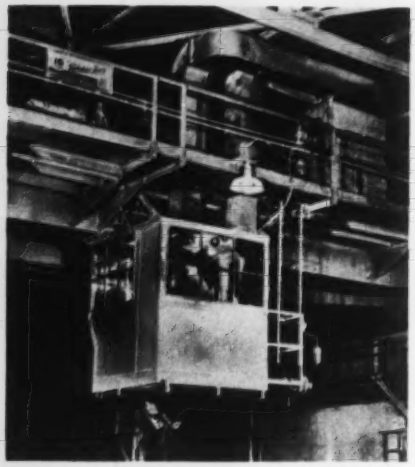
Such topics as:

air valve stems on coal washers, anchor chain, annealing retorts, ball cages in universal joints, band saws, bolts, boring bars, bridges, bumpers for passenger cars, cable-tool and churn-drill bits, caustic evaporators, centralization feed pumps.

This big, fully documented 207 page book gives more than 50 complete case histories of alloy steel usage . . . such as outlined above. And each case history is an *idea*-starter of its own! Everything from "ANNEALING RETORTS" to "TRIMMER BLADES". Get your copy today. Address Dept. 3, on your letterhead, please. *Climax Molybdenum Company, 500 Fifth Avenue, New York 36, N. Y.*

This advertisement is printed in one shade of molybdenum orange, a pigment widely used for its striking color and good coverage — ideal for paint on industrial equipment . . . brings high visibility, that means extra safety.

CLIMAX MOLYBDENUM



Comfort Enters the Crane Cab

Blistering heat over soaking pits and ladles holds no terrors for these cranemen in air conditioned cabs

ABOVE OPEN soaking pits, heat and fumes make life miserable. Much of the time pit crane operators work in temperatures of 140 to 160 F.

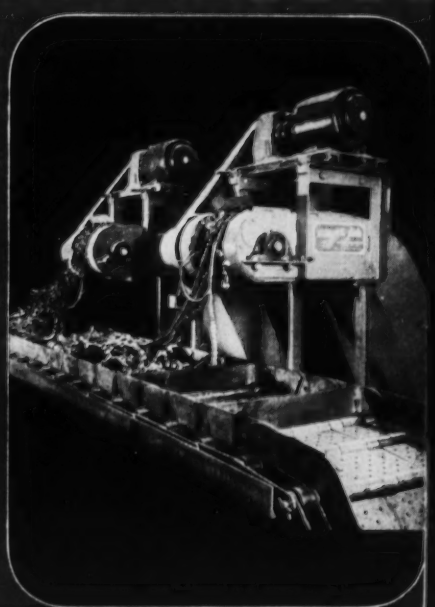
A large steel tube mill turned to air conditioning to ease the lot of operators. Five cranes serving soaking pits, electric furnaces and handling ladles were equipped with model C-5 crane cab conditioners (Dravo Corp., Pittsburgh). The move cut crane labor costs in half.

Formerly, it was necessary to change operators every 30 minutes. Between jobs they descended from their cabs to get out of the heat. Sometimes they collapsed and rescue work was dangerous.

Now that the conditioners keep cab temperatures at a comfortable 75 to 82 F range, operators work a full shift without relief. Fumes and dust are kept out by filters, and when needed in winter, electric heaters warm the air in the cab.

Dollar savings in operating costs have justified the installation, not to mention the boost to operator safety and morale.

May-Fran
...first
for
AUTOMATION
in
scrap
handling
systems



The CHIP-TOTE conveyor permits complete utilization of machine tools by eliminating shut-down for manual scrap removal.

It handles a continuous flow of hot, wet or dry chips, turnings and borings from any multiple spindle automatic machine.

Tongs Ease a Tiering Problem

Automatic jaws come to grips with a wire moving and stacking situation. Greater ease and safety result

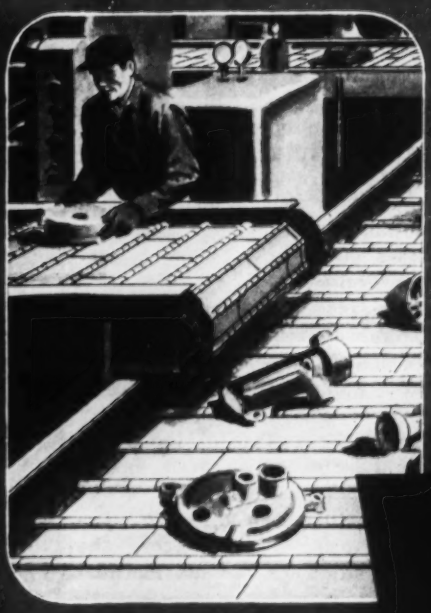
TONGS ARE making life easier in a wire warehouse. They've taken over a job formerly handled by wire harness at the Pittsburg, Calif., plant of Columbia-Geneva Steel Division, U. S. Steel Corp.

Wire coils are trucked into the warehouse in racks called skips. The skips, which weigh 3 to 5 tons loaded, are designed to interlock with each other and tier four high.

Old practice was to tier skips by overhead crane, using a wire sling and pipe spreader bar harness. Two men had to climb the tiers to hook on and take off slings.

Tongs made by Heppenstall Co., Pittsburgh, do the job automatically. The craneman lowers opened tongs over a skip. As they are raised, they close. When the skip has been deposited, a few more inches of downward movement locks the tongs open again for the next load. Tong jaws open to 65 in., giving 4-in. clearance on each side of the skip.

The tongs save time and there's no longer danger of injury from climbing tiers.



Hinged-steel belting handles scrap as well as hot heavy and abrasive castings. Belt is economical . . . maintenance-free.

Now is the time to put AUTOMATION to work . . . Now is the time to cut production costs . . . May-Fran engineers design and build complete scrap handling systems for the automatic removal of machine turnings or chips. May-Fran conveyors will transmit scrap to ultimate point of disposal.

Press Scrap systems can be made completely automatic. Hinged-steel belt will take scrap from presses, handle it through blanking, shearing, forming and baling processes, and deliver it to rail cars.

May-Fran is prepared to engineer, fabricate and install complete conveyor systems to your specifications.

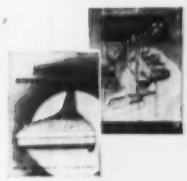
DESIGNERS AND ENGINEERS OF COMPLETE SCRAP HANDLING SYSTEMS

MAY-FRAN ENGINEERING, INC.

Write today for complete information on how an automatic scrap removal system will cut your production costs.

Bulletin MF-530 describes the new Hinged-Steel conveyor belt.

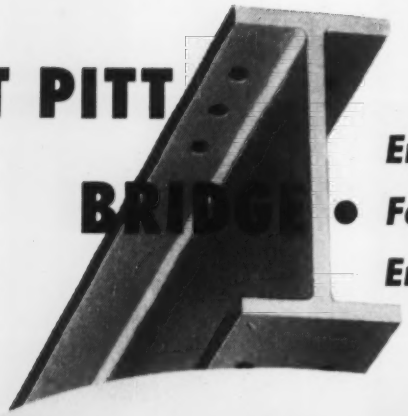
Bulletin MF-640 describes the Chip-Tote conveyor which removes scrap from operating machines.



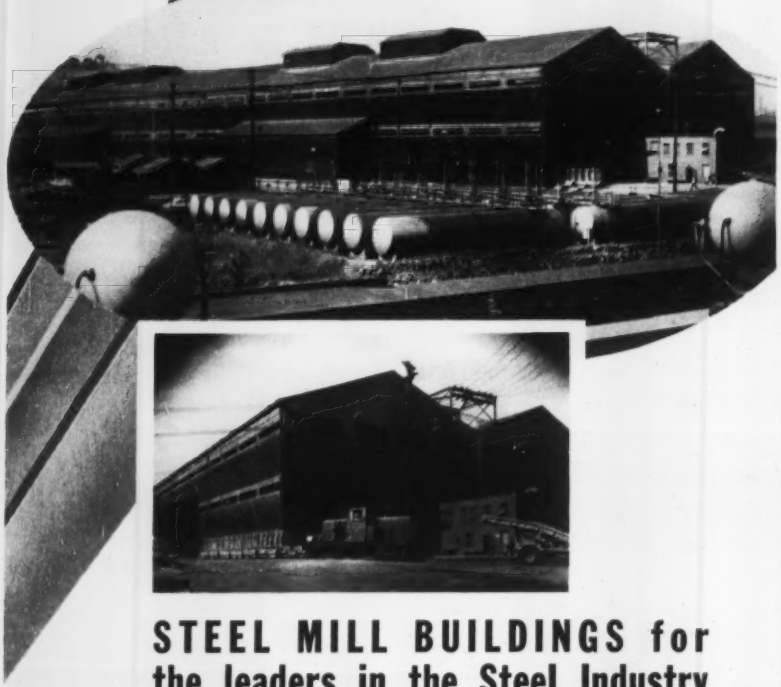
5093-MF

1725 CLARKSTONE ROAD
CLEVELAND 14, OHIO

FORT PITT BRIDGE



Engineers • Fabricators Erectors



STEEL MILL BUILDINGS for the leaders in the Steel Industry

It has been our pleasure to work with many of the steel producing companies by furnishing the structural steel for their new and expanded mill buildings.

On your next structural steel project, why not utilize the experience and facilities of Fort Pitt —structural steel specialists for over 57 years.

Steel Permits Streamlining Construction with Safety, Endurance and Economy

AISC — AMERICAN INSTITUTE OF STEEL CONSTRUCTION INC. — FOUNDED 1921

Fort Pitt

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Air-Actuated Bar Feed

Feeding bars to automatic screw machines meant downtime and marred stock before

TO INCREASE production of voting machine door-hinge rods, methods engineers at Automatic Voting Machine Co., Jamestown, N. Y., discarded manual feed fingers in favor of an automatic magazine loading pneumatic bar feed.

The rods were formed and cut on a No. 00 Brown & Sharpe automatic screw machine to 3-17/64-in. lengths. They had to be held to plus 0.009, minus 0.003-in. C1213 steel rods, 7/32-in. OD and in lengths of 10 or 12 ft, were fed manually through feed fingers to the spindle and collet of the automatic screw machine.

Cut Cycle Time — To increase production, AVM first cut the cycle time of automatic screw machine to 4½ seconds by devising a cutting tool that formed two shoulder trunnions simultaneously at each end of the piece. The piece was supported at one end by the turret stop.

The manual feed method still presented a number of problems. Since the door-hinge rods are rather long, a steel rod would feed through the B & S in about 3 minutes. To keep the machine stocked, the operator has to be present at the end of each 3-minute interval to reload the machine. This was difficult, because he was responsible for other machines in his bay. Inevitably, delays resulted.

Besides scratching stock, feed fingers were too tight or too loose. When loose, the bore of the feed finger would not hold the pins to proper length. When tight, they marred the surface of the stock. The rate at which feed fingers were replaced was high.

Air-Actuated Feed — To overcome these disadvantages, the same automatic screw machine was equipped with a model 43 Lipe-Rollway AML bar feed. Feed is actuated by air valves and cylinders. About 100 steel rods are racked in a magazine along one side of a split stock bar tube, the lower half of which slides back-

A SURVEY of importance to industrial managements

Leadership

in any sphere of industry is usually well defined — by product, service, reputation. For a recent widespread survey, an outside unbiased research organization selected *files* . . . contacted the purchasing heads of 37 types of potential file-using industries . . . and came up with these interesting facts.

"What make or brand of files do you prefer?"

"NICHOLSON" was voted first choice in 79% of the replies. Nearest to this were competitive brands "A," "B," "C" and "D" with 26%, 15%, 7% and 5% respectively. Eleven remaining brands received scattered preferences totaling 10%. (Some 200 replies contained two or more "first" choices.)

"What is of first importance in your file-brand preference?"

"Product reputation," said 295 respondents. "Service," said 282. Only 28 said "Price."

"From what sources do you buy your files?"

"From Industrial Distributors," said 619 out of 695 — about 89%. And where Nicholson or Black Diamond brand is concerned the rate would be 100% — for that is the only channel through which Nicholson sells to the widespread industrial market.

• • •

The fact that these findings bear close similarities to other independent surveys made in the past leaves no doubt where Nicholson brands stand.

And what are the fundamentals to this emphatic Nicholson leadership? Product QUALITY, PERFORMANCE, UNIFORMITY and VALUE of the highest order. Product VARIETY that truly covers *A file for every purpose.* And, through your Industrial Distributor, the most helpful technical and supply SERVICE ever organized by any file manufacturer *anywhere.*

NICHOLSON U.S.A.

NICHOLSON FILE COMPANY, PROVIDENCE 1, R. I.

(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)

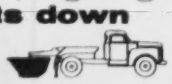
BLACK DIAMOND MADE IN U.S.A.

NICHOLSON FILES *FOR EVERY PURPOSE*

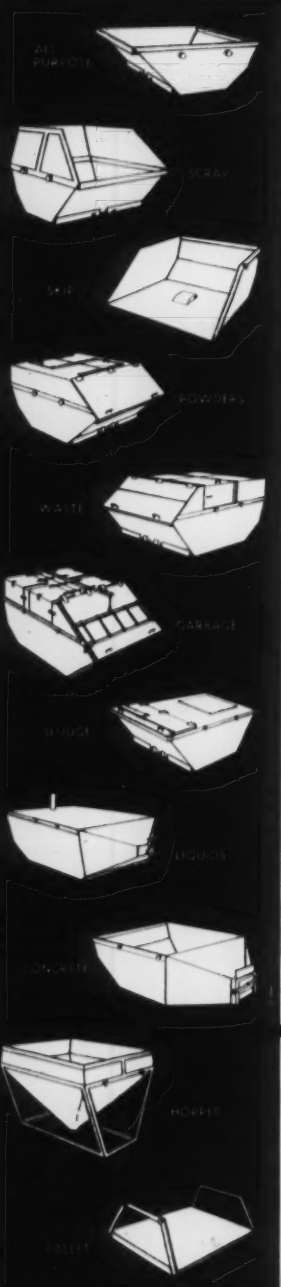
picks up

hauls

dumps

puts down


THE BROOKS
LOAD LUGGER
TRADE MARK REGISTERED



What it is . . .

The LOAD LUGGER is a truck body with a pair of powerful hydraulic arms for loading and dumping. It mounts on any standard truck chassis, lifts up to 18,000 pounds, and is operated by the driver from his cab.

How it is used . . .

The truck-mounted LOAD LUGGER is used with patented, liquid-tight LOAD LUGGER CONTAINERS holding up to 15 cubic yards, and with LOAD LUGGER PALLETS. It hoists loaded containers or pallets onto its bed, carries them well forward and securely cradled between sidewalls, dumps them, and puts them down.

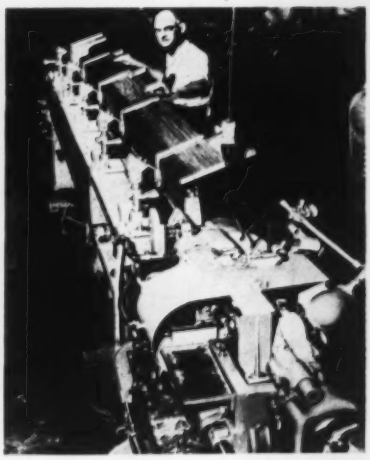
The truck-mounted LOAD LUGGER can also carry materials directly on its flat bed, loading and unloading heavy objects with its hoisting arms, even large cable reels.

Why it saves you money . . .

The LOAD LUGGER SYSTEM calls for a number of LOAD LUGGER CONTAINERS to be placed where needed for the direct collection of material as it accumulates, and for a truck-mounted LOAD LUGGER periodically to pick up, haul, dump, and return the containers. The system can eliminate lost time, loading crews, and several ordinary trucks and drivers.

The truck-mounted LOAD LUGGER carries more pay load than any comparable equipment. Its patent-protected simplicity of design and construction, with no cumbersome super-structure or fancy gadgets, results in a lower first cost and lower maintenance costs. It operates easily and with complete safety.

patented and manufactured by the
BROOKS
EQUIPMENT & MFG. CO.
2057 DAVENPORT ROAD, KNOXVILLE, TENN.
USED ALL OVER THE WORLD
Send for a catalog today.



BAR FEED SETUP
. . . cuts manual feed slowdowns

ward to receive the bottom rod in the magazine.

A stock pusher, inside this tube, moves the bar into the spindle and collet of the automatic screw machine. After the rod has been almost entirely fed through the machine, its end remnant is ejected automatically by a new rod.

Changeover from manual to pneumatically-activated, mechanical stocking of steel rods upped production on the Lipe-equipped B & S about 170 per cent. This figure largely expresses the efficiency gained by eliminating completely the need for frequent loadings by hand.

Welding Metals

A combination text and reference book, "Metals and How To Weld Them" by T. B. Jefferson, will give users of welding practical working knowledge and source of information for designing and making better welds at lower cost. It has been organized and written to explain in readily understood steps the structure and properties of metals.

The first six chapters are devoted to an elementary discussion of metals, their mechanical and physical properties and uses. The final section is devoted to information for making good welds, trouble shooting, cost estimating and explanation of welding terms. All commonly-used types of metals are covered. Price is $2.00 in U.S.A., $2.50 elsewhere. Publisher is James F. Lincoln Arc Welding Foundation, Chicago.

NEW PRODUCTS and equipment

Reply card on page 199 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue.

Contour Roll Lathe

. . . live or neck centers

This 36-in. contour roll lathe handles necks or live centers. Speed range is 0.75 to 53.5 rpm. Roll capacities: Minimum diameter, 6 in.; maximum diameter 36 in.; maximum length, 11 ft, 6 in.

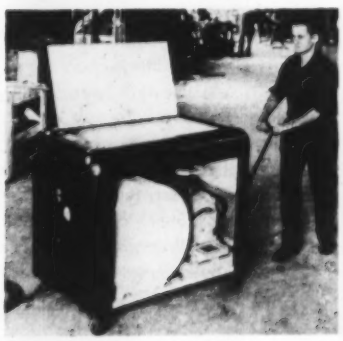
Completely hydraulic tracer control insures a smooth, accurate finish. Tool post and carriage are designed to use single point carbide-tipped tools or regular roll turning tools. Ways on carriage and tail stock are nonmetallic. Timken roller bearings are used throughout, with herringbone gearing and automatic lubrication. Youngstown Foundry & Machine Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 1

Vacuum Pumps

. . . weigh 900 lb

The VacForm Mobile Pump Wagon is housed in a protective metal cabinet with removable pan-



els. It is mounted on a heavy steel frame with a swing back top door opening for convenience. It has rubber tired ball bearing wheels on swivel casters to permit effortless trundling from place to place. Wheel locks keep the unit in place.

In place, it is connected by a heavy duty hose to equipment to be used, such as presses, sealers, concentrators, driers, molding units, etc. Adaptable to varying electrical requirements, the pump wagon is just pugged into an ordinary electrical connection. Vacuum Forming Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 2

Drill Presses

. . . heavy duty

The 1600 Series offer rugged, streamlined drilling units with a

full 16-in. swing, a spindle travel of 6 in. and a capacity of ½ in. Jacobs Chuck or No. 1 Morse Taper spindle can be ordered.

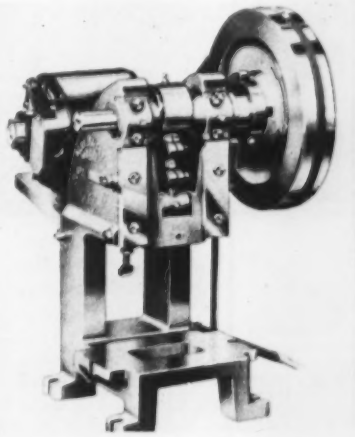
A push button motor switch is built into the head. Other features include: Adjustable spindle return stop, quill lock handle, four precision ball bearings with sealed in lubrication on spindle, micrometer-type depth stop with quick adjustment, vernier movement for precise work, quick release motor base for changing speeds easily. Universal Gear Works Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 3

Punch Press

. . . power, bench type

Model B-2 two-ton press is ideal for production of small stampings, assembly or secondary operations.



It features quick action, single pin clutch with positive, nonrepeat or repeat action. Straight ram guides with flat gib give accurate fitting of dies for precision stamping. Extra large die space for stamping, forming, drawing, cutting, riveting, blanking, etc., is provided.

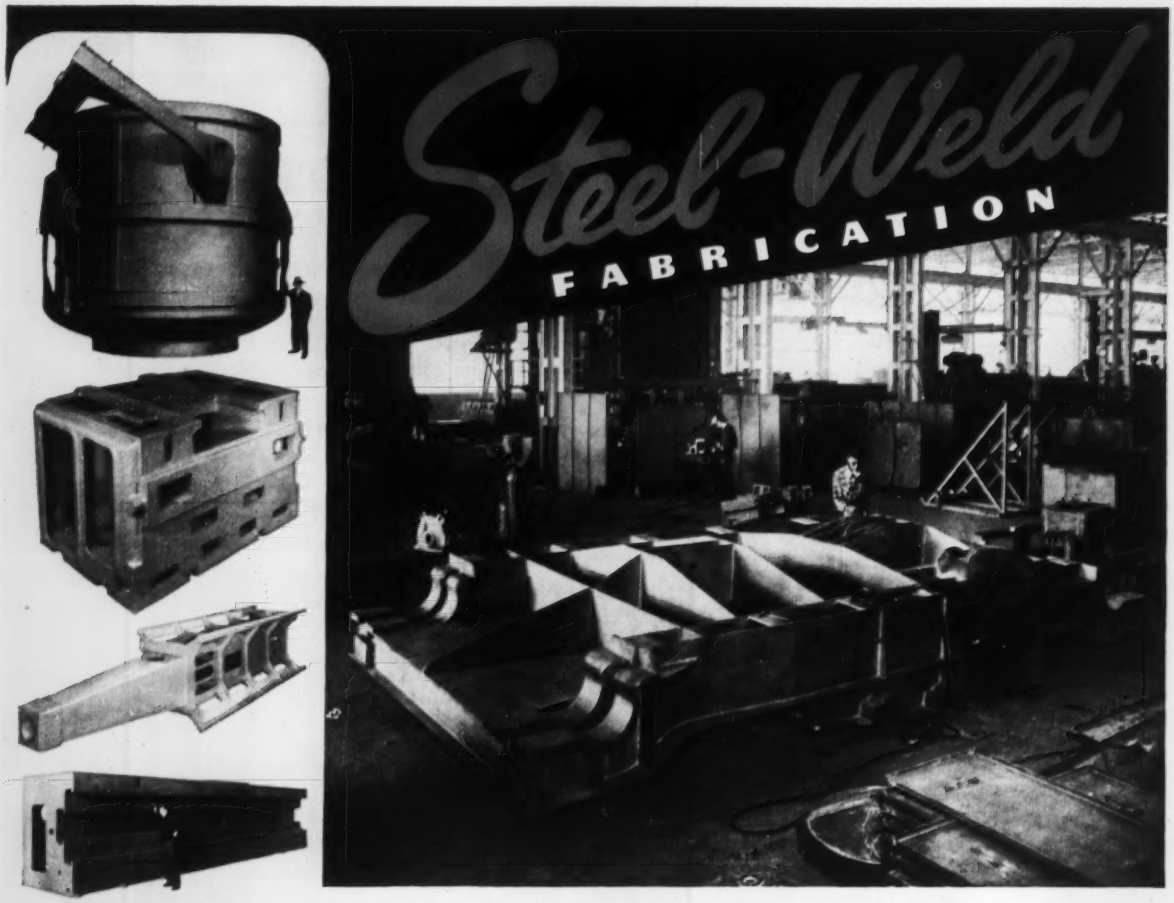
The press has a capacity of up to 200 operations a minute. Alva F. Allen.

FOR MORE DATA CIRCLE REPLY CARD NO. 4

Variable Speed Drives

. . . in nine sizes

Ranging from ½ to 10 hp at 1750 input rpm, the reducer incorporates these features: Power is transmitted from the input shaft to the output shaft through alloy steel driving balls that are



Use WELDED STEEL for Greater Strength with Less Weight!

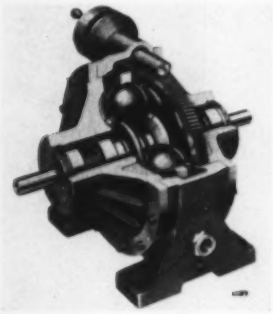
Heavy Steel-Weld Fabricated parts like the piece illustrated above, and the parts and assemblies shown at the left, are typical examples of work produced by Mahon for hundreds of manufacturers of processing machinery, machine tools, and other types of heavy mechanical equipment. If you need a complete special mechanical device or piece of equipment, or if you require parts or assemblies involving large heavy pieces where time and pattern costs are a consideration, you can turn to Mahon with complete confidence . . . personnel and facilities are available within the Mahon plant to do the complete job from drawing board to finished machining and assembly. You will find in the Mahon organization a unique source with ultramodern fabricating, machining and handling facilities to cope with any type of work regardless of size or weight . . . a source where design skill and advanced fabricating technique are supplemented by craftsmanship which assures a smoother, finer appearing job embodying every advantage of Steel-Weld Fabrication. See Mahon's Insert in Sweet's Product Design File, or have a Mahon engineer give you complete information.

THE R. C. MAHON COMPANY
DETROIT 34, MICHIGAN

Engineers and Fabricators of Steel in Any Form for Any Purpose

MAHON

in pressure contact with discs attached to two shafts; relative speeds of the shafts are adjusted through a 9:1 range by changing the angular positioning of the



axles on which the balls rotate.

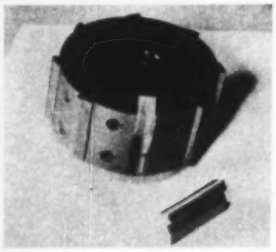
Simplicity of construction makes possible accurate speed regulation without complicated linkage and without drift. Cleveland Worm & Gear Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 5

Milling Cutter Combination

. . . carbide tipped blades

The combination consists of a cutter body and inserted blades that are carbide tipped. They are form relieved to reproduce serrations in such items as inserted



blades of milling cutters, boring bars, counter bores, spot facers and reamers.

General Electric Carboloy Department's grade 78B is used to tip the inserted blade and is said to require less regrinding to maintain the serrated teeth. Fenton Carbide Tool Co. Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 6

Motor

. . . explosion proof

These motors feature extra protection for hazardous location applications. They are available in ratings from 1 to 5 hp. They are

Distortion is Controlled in BRAD FOOTE'S DEEP CASE HARDENING

The BRAD FOOTE DEEP CASE HARDENING process has been perfected to a degree which practically eliminates distortion

GEARS RUN TRUE

No place is distortion control more important than on heavy duty gears which are run almost continuously at full rating and subjected to extreme shock loads such as are encountered in rolling mill operations. BRAD FOOTE **DEEP CASE HARDENED** gears run true and distribute the load evenly across the full face and on the designed bearing surfaces of each tooth.

HARD TOOTH SURFACES

In addition, BRAD FOOTE rigidly controls to set standards the depth of **DEEP CASE HARDENING** and the carbon content. The tooth surfaces are of maximum hardness for long life, but the carbon content is gradually diminished at successive depths below the surface until it blends to the metal of the core itself.

SHOCK-RESISTANT CORES

Thus the cores of the teeth and the body of the gear remain ductile and shock-resistant while the teeth are given an increase in service life of over 50%.

ASK FOR QUOTATION

It will pay you to try a set of these gears on your toughest job. Send your specifications today for quotation.

BRAD FOOTE *makes* Spur, Bevel, Helical, Spiral Bevel, Herringbone, Zerol, Worms, Worm Gears, Reducers, Transmissions

BRAD FOOTE GEAR WORKS, INC.

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Bishop 2-1070 • OLympic 2-7700 • TWX: CIC-2856-U

subsidiaries

AMERICAN GEAR & MFG. CO.
Phone: Lemont 920
Lemont, Illinois

PITTSBURGH GEAR COMPANY
Phone: SPaulding 1-4600
Pittsburgh 25, Pennsylvania

COLD-FORMING

ANOTHER example of the BIG TREND in metalworking

"MOVE the metal ...it's cheaper than REMOVING it!"

• Pole shoes being swaged on a 600 ton high-speed Lake Erie Hydraulic Press. Production of these pieces averages 2,000 per hour.

PAYS OFF 4 WAYS!

A major producer of automotive parts and electrical systems reports:

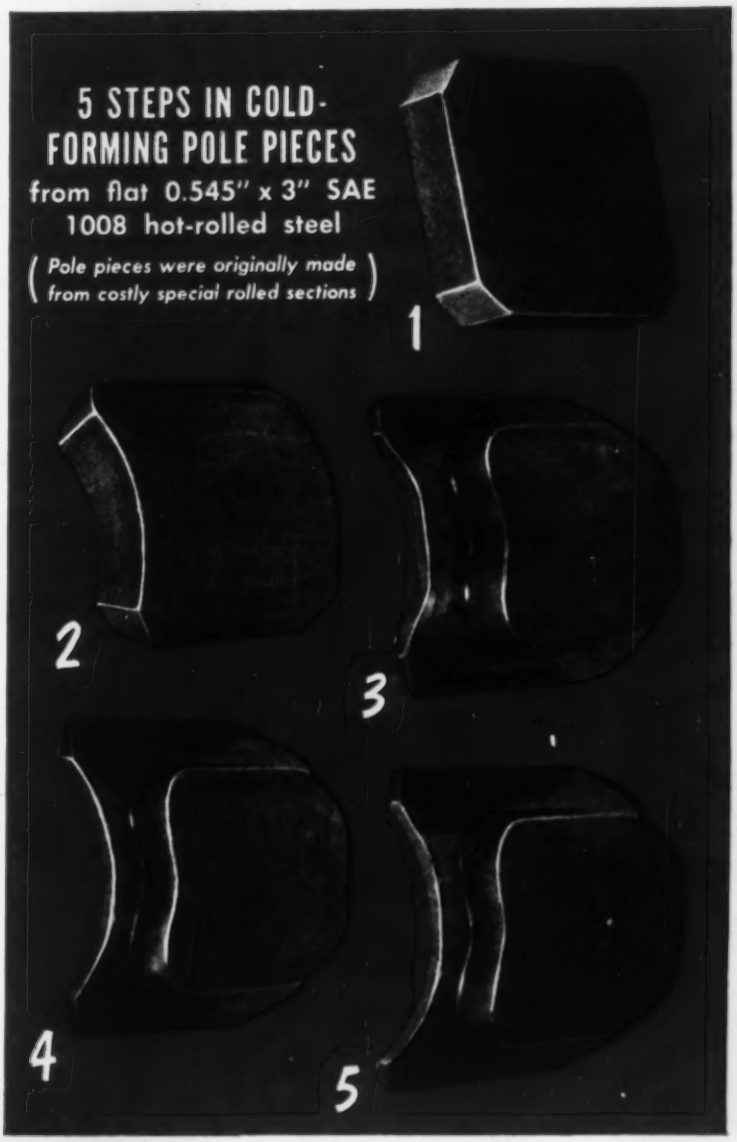
1. MATERIAL SAVINGS
of 50% or more common in production of automotive parts.

2. LOWER TOOLING COSTS
because special-purpose machines are eliminated.

3. DELAYS AVOIDED
in starting production.

4. HIGH PRODUCTION RATES
are realized with cold-forming processes (sizing, swaging, coining and extruding).

The big trend in metalworking today is to press metal into a desired shape rather than to shape it by machining. This results in new and better products at lower cost. These new processes include cold "pressure" forging of aluminum, cold extrusion of steel, and high pressure closed die extruding of aluminum, brass and other non-ferrous alloys. Also falling within this category are somewhat older though greatly changed and improved methods for the extrusion of aluminum, hot forging of ferrous metals, powder metallurgy, deep drawing of sheet and die casting. These new and improved production techniques are already saving millions of dollars in materials and production time. Lake Erie engineers are in the forefront of these developments. They will be glad to explore applications in your production. No obligation. Call us.


5 STEPS IN COLD-FORMING POLE PIECES
from flat 0.545" x 3" SAE 1008 hot-rolled steel
(Pole pieces were originally made from costly special rolled sections)
1
2
3
4
5

LAKE ERIE HYDRAULIC PRESSES

LAKE ERIE ENGINEERING CORP.
General Offices and Plant:
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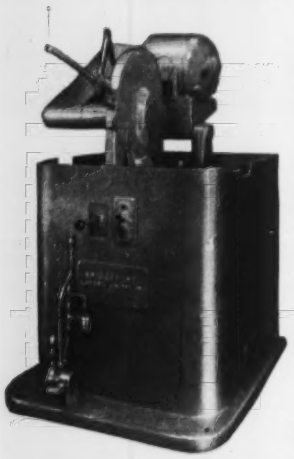
District Offices: New York, Chicago, Detroit, Pittsburgh
Representatives in Other U. S. Cities and Foreign Countries
HYDRAULIC PRESSES • DIE CASTING MACHINES
ROLLING MILL AUXILIARY EQUIPMENT

LAKE ERIE®

THE BRIDGEPORT "ABRASAW"

12 TO 20 TIMES FASTER THAN SAW CUTTING

ABRASIVE CUT-OFF MACHINES



HEAVY WEIGHT, PRECISION-MACHINED, DESIGNED FOR LONG, TROUBLE-FREE SERVICE

MODEL 49-W Heavy duty, 3½" Solids, 5" Tubing or Light Sections . . . Chop Stroke, 18" Dia. Wheel.

THESE MONEY-SAVING FEATURES ARE YOURS WHEN YOU SPECIFY BRIDGEPORT:

- Clean, close cuts of ferrous and non-ferrous metals of all kinds, as well as almost any other industrial material, including plastics, glass, ceramics, brick, brake linings, etc.
- The BRIDGEPORT "ABRASAW" cuts $\frac{5}{8}$" round cold rolled steel in 1 second; 1" square tool steel in 3 seconds; $2\frac{1}{4}$" O.D. x $1\frac{13}{16}$" I.D. SAE 1030 tubing in 7 seconds; etc.
- Chop stroke or reciprocating head
- Hand or power operation
- Wet or dry cutting
- Treadle or air operated vise
- Straight or angle cutting
- With or without vise
- Built-in Coolant System
- Surplus power in all models
- Meets strictest of safety requirements
- Write, today, for the new "ABRASAW" Bulletin

LOBDELL UNITED COMPANY

1836 WILMINGTON 99, DELAWARE 1954

A SUBSIDIARY OF UNITED ENGINEERING AND FOUNDRY COMPANY

NEW PRODUCTS and equipment

designed for safe applications in classified atmospheres containing flammable gases or combustible dusts.

They have heavier frame and end shield castings and a ma-

chined-fit conduit box secured to the frame with four bolts. The end shields are fastened to the frame with external bolts to avoid a flame path to the interior of the motor. General Electric Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 7

Gage

. . . sturdy performer

This instrument was developed to satisfy the requirements of a

production gage for use at the machine or in final inspection. This internal groove diameter gage eliminates many delicate, easily-broken details of present groove gages. It will repeat to tenths, making it good for parts with close tolerances.

It may be supplied for standard O ring and ring snap grooves, with bores from 0.480 to 4.750 in. in diameter. A. G. Davis Gage & Engineering Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 8

Power Saw

. . . for cutoff operations

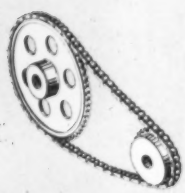
This is a high-speed steel saw band on contour sawing machines. It has a set of exclusive adjustments and hydraulic controls for feed pressure, band tensioning and

First choice of cost-wise buyers

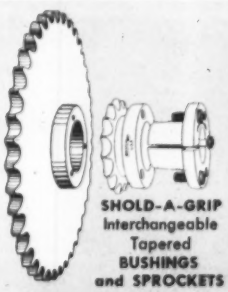
BOSTON gear®

6562 "off the shelf" STANDARD STOCK TRANSMISSION PRODUCTS

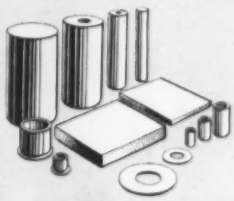
STOCK GEARS: Spur • Racks • Miter • Bevel • Helical • Worms and Worm Gears



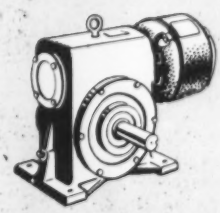
SPROCKETS and CHAIN
For drives ranging from fractional to 40 hp



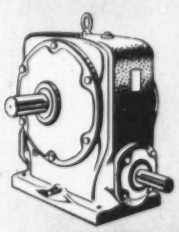
SHOLD-A-GRIP
Interchangeable Tapered **BUSHINGS and SPROCKETS**
Fit sprockets up to 24" pitch dia. to any shafts ½" to 3" by 16ths



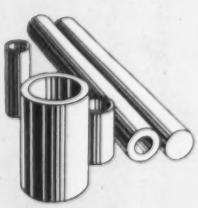
BOST-BRONZ
oil-impregnated **BEARINGS**



RATIOMOTORS
Motorized Speed Reducers
32 types—1/20 hp to 3 hp



REDUCTORS
Standardized Speed Reducers
.005 hp to 36 hp



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BALL BEARINGS

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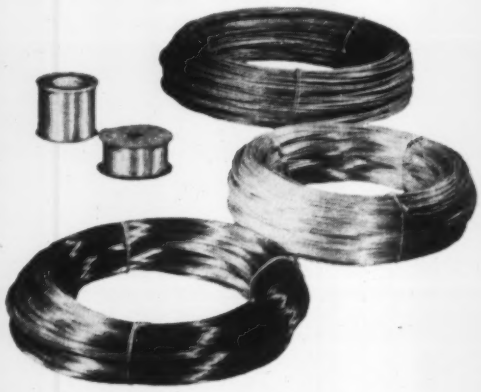
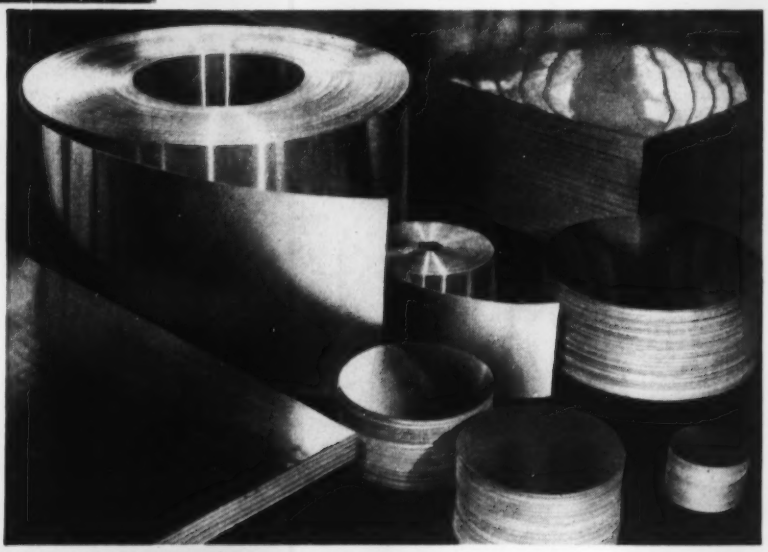


Wire

Supplied as round drawn, hexagonal, rivet, welding, screen, EC, redraw.

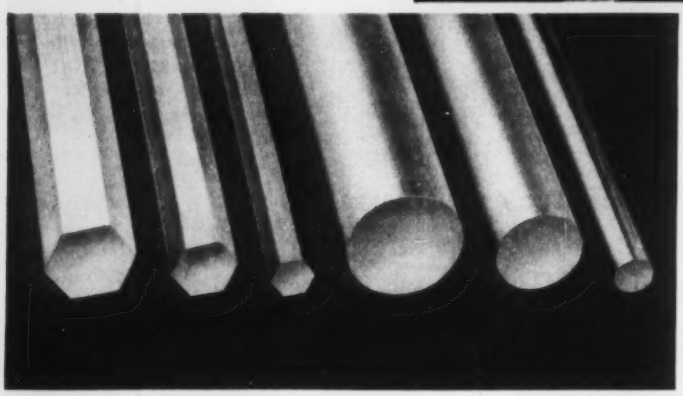
Extruded Shapes

All standard alloys are available in custom shapes (solid, semi-hollow and hollow), structural, rod and bar, and in extruded tube.



Sheet and Plate

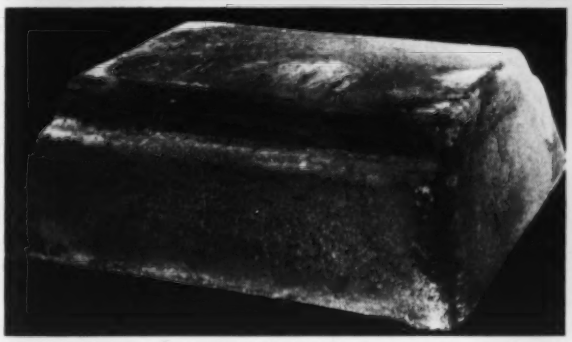
Supplied as flat sheet, plate, coil sheet, circles in a complete range of alloys, sizes and tempers. Specialty sheets available on inquiry.

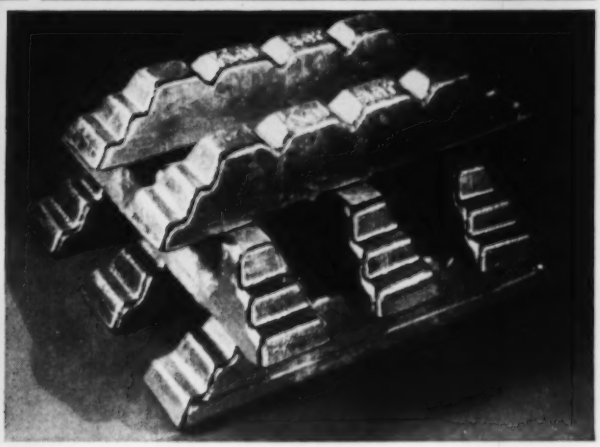


Rod and Bar

Available in a wide range of alloys in rolled and cold finished rod, round and hexagonal standard screw machine stock, hexagonal bar, redraw rod, rivet rod and round forging stock, square and rectangular bar.

for you...the nation's fabricators





Pig, Ingot and Billets to meet your specifications

Kaiser Aluminum produces Pig, Ingot and Extrusion Billets in a range of alloys and sizes to meet your specific requirements. In addition, Kaiser Aluminum provides the services of its engineers to work closely with you to select proper alloys or to help improve production methods.

MORE THAN 85 per cent of Kaiser Aluminum's total production is sold in the form of these mill products for fabrication by customers. It's the highest percentage in the industry.

We believe we are ideally equipped to work with you, because serving manufacturers with basic aluminum is our primary business.

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We believe that the kind of service we offer—combined with the unsurpassed quality of Kaiser Aluminum—should be of particular interest to all aluminum fabricators in these days of stiffer competition.

For complete information, call or write any Kaiser Aluminum sales office or one of our many distributors, located in principal cities. See our catalog in Sweet's Product Design File or write for copy. Kaiser Aluminum & Chemical Sales, Inc., General Sales Office, Palmolive Bldg., Chicago 11, Illinois. Executive Office, Kaiser Bldg., Oakland 12, California.

Other Kaiser Aluminum products include: industrial foil, and electrical conductor. Kaiser Aluminum also supplies household, freezer and broiler foil for home uses; Shade Screening for the building industry and roofing and siding sheet for farm and industrial buildings.

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In this large area machine shop National rolls receive their finishing touches—and only the most modern machine tool equipment is used to assure precision. There are roll grinders for both rough and finish grinding, a battery of 40-inch rough turning lathes, as well as an 8′ x 22′ Ingersoll Milling machine, a large radial automatic feed drill press, an 8′ x 67″ x 36′ stroke planer, plus many smaller but equally modern machines.

With these excellent machining facilities, you are assured of precision finishing in every National Roll you buy.

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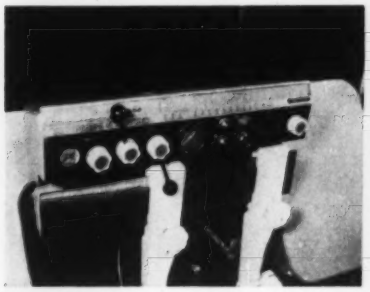
AVONMORE, PENNSYLVANIA

SPECIALISTS IN IRON, ALLOY IRON AND STEEL ROLLS AND CASTINGS, STEEL ARMOR CASTINGS

infinitely variable speed change.

Close-up shows the control panel on the automatic model. All phases of machine operation are easily regulated from this position. Included are controls for blade speed, feed



pressure, coolant. Band tension, preset at factory, is maintained hydraulically. The C-56 will automatically produce blanks up to 24 in. long and stop upon depletion of stock. They are for high production cut-off operation. DoAll Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 9

Steel Milling Grade

. . . increased hardness, strength

This grade of sintered carbide, Firthite TXL, combines increased hardness, strength and increased shock resistance.

With a Rockwell A hardness of about 92 and strength comparable to the stronger steel cutting grades, it is a general purpose milling grade. In tests conducted by Firth, the carbide has increased the amount of metal removed in mass production operations and materially reduced unit costs through uniform performance. Firth Sterling Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 10

Hardness Tester

. . . triple duty

Three colored lights on the new color glance tester signal the Brinell hardness of the test piece and indicate its acceptability. A dial indicator replaces the indicator used before. When tied in automatic part handling on a production line, the unit can sort the work after testing, making the operation automatic.

Limits are adjustable to suit the requirements of each job. During

How would you solve it?

(1) Production Problem: To cut unit costs of grinding and polishing stainless steel whip-cream dispenser cans. Nilsen Mfg. Co. had been jobbing out the cans to an outside source, paying a high .08¢ per can, due to old-fashioned methods, labor, material and delivery costs.

(2) Solution: A 3M Representative recommended that this Addison, Illinois, manufacturer install the 3M Method, using Grit #180 Resin Bond Belts running over a special contact wheel. Cans to be finished were placed on automatic work holders.

(3) Results: An immediate reduction in polishing costs. By installing the 3M Method, and doing the work themselves, Nilsen Mfg. Co. cut costs to only $.0125 per finished unit . . . a saving of $.0675 per can! A 3M Representative can help you solve your grinding and finishing problems, too. His services are available without cost.

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Made in U.S.A. by Minnesota Mining and Mfg. Co. General Offices: St. Paul 6, Minn. In Canada: London, Ont., Can. Export: 122 E. 42nd St., New York City. Makers of "Scotch" Pressure-Sensitive Tapes, "Scotch" Sound Recording Tape, "3M" Adhesives, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing.

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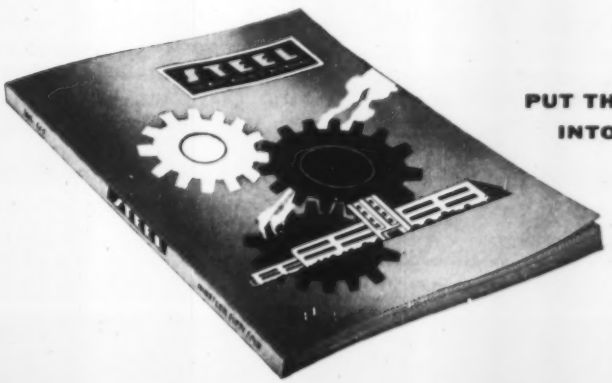
Ask the man from STEEL to show you how STEEL Magazine helps you size up your metalworking sales opportunities, helps make your sales and advertising program more effective, and helps give your product story *added strength where it does the most good!* STEEL, Penton Building, Cleveland 13, Ohio.



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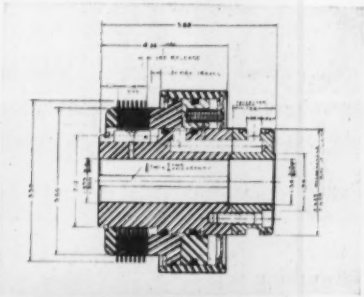
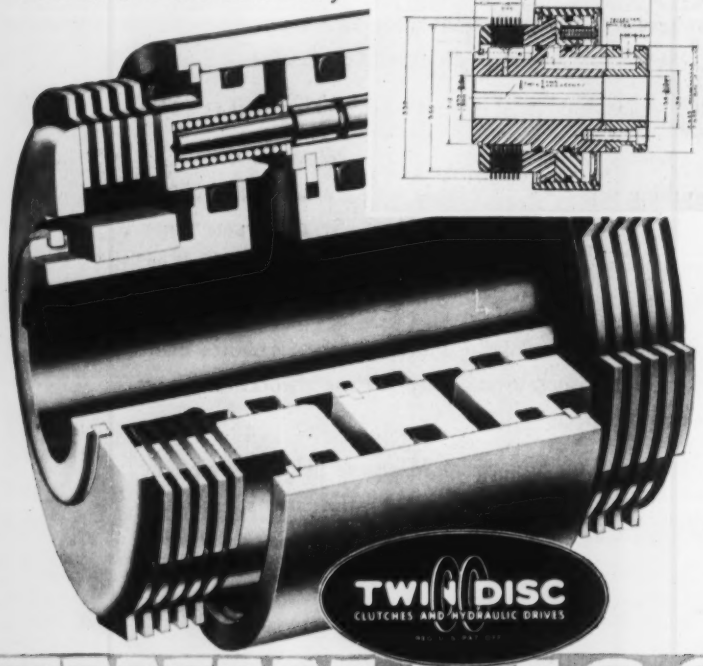
CONSIDER the *outstanding* advantages you will gain by designing Twin Disc Oil-Actuated Multiple Plate Clutches into your machines: 1 You'll *eliminate entirely* the need for clutch adjustment, and maintain *constant torque.* The integral oil cylinder acts as a floating pressure plate, *automatically increasing in travel as the plate stack wears.* The torque value *cannot* decrease . . . there is *no* chance for an inexperienced operator to "burn up" the clutch. 2 With *high, constant* torque capacity, it is often possible to use a *smaller* size clutch—permitting more *compact* installations. 3 You'll have *ready adaptability to remote control,* eliminating complicated actuating linkage. 4 You'll benefit from *consistently longer wear-life,* since there is no possibility of plate slippage.

Write to Twin Disc Clutch Company, Racine, Wisconsin, for *complete* information.

Blueprint of Model MOS (single) and cutaway view of Model MOD (duplex) show interlocked pistons of Twin Disc Oil-Actuated Multiple Plate Clutch. Write for latest Bulletin No. 303.





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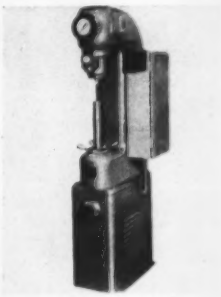
NEW PRODUCTS and equipment

the test cycle, a light flashes to indicate the hardness category of



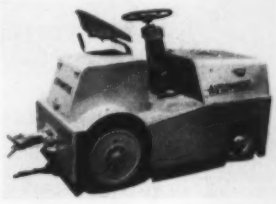
the part under test. Steel City Testing Machines Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 11

Gas Tractor

. . . with electric transmission

The Model GLT's electric, infinite step transmission provides gentle starting with infinite pull and acceleration. It eliminates the friction clutch and gear shift mechanism without getting into relatively high fuel consumption systems.



The mechanical linkages between engine and wheels are eliminated, transmission of shock loads to engine is reduced. Automatic Transportation Co.

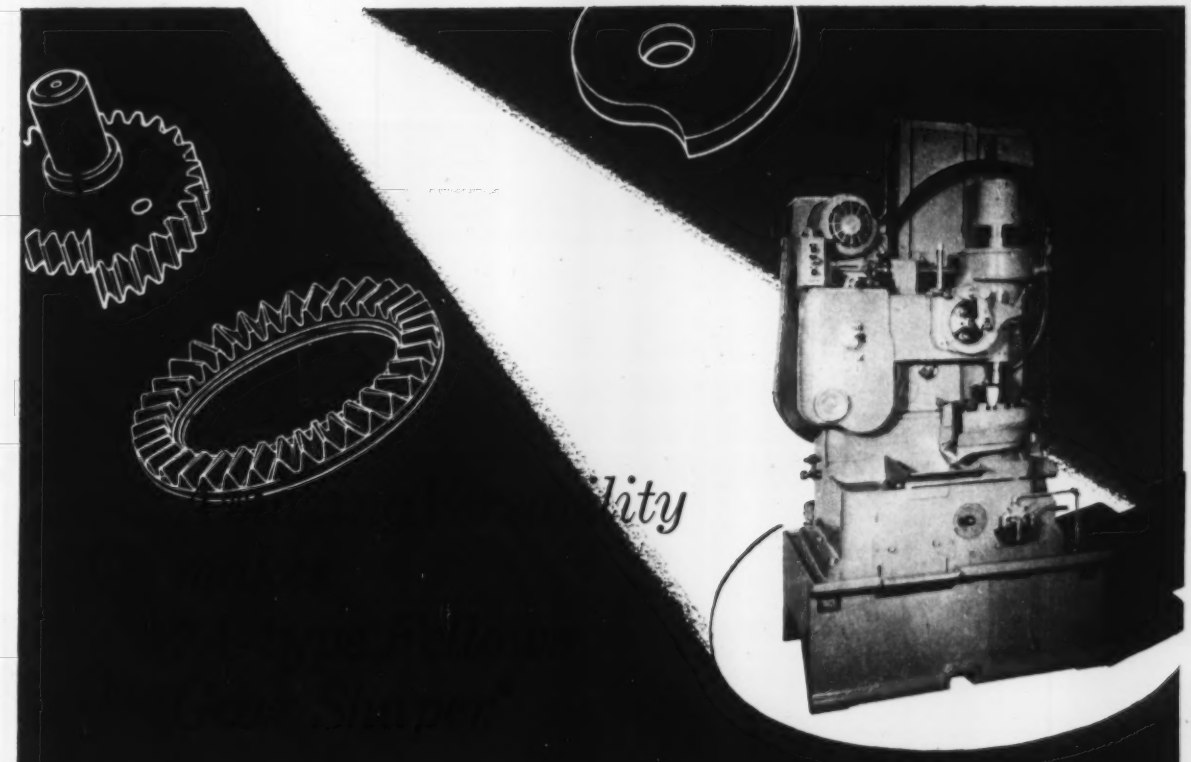
FOR MORE DATA CIRCLE REPLY CARD NO. 12

Calculator

. . . for stainless strip

The calculator facilitates quick and easy calculation on the purchases of stainless steel strip. It uses as variables the length and weight of cold rolled stainless steel strip and translates into pounds any length and width of stainless steel according to its gage. It indicates widths from ⅛ to 12 in., lengths from 100 to 10,000 ft, gages from 0.003 through 0.150 in.

On the reverse side of the calculator is a slide table to deter-



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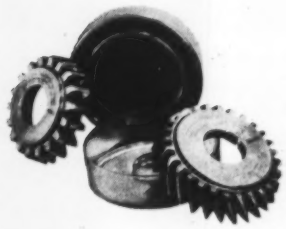
Some use this 'one-machine gear shop' for close-limit internal gears, others for helical gears of open or shoulder design, still others for "on" or "off" center face gears.

For this single machine can be used to cut hundreds of different types of gears, cams, splines and odd shaped contours. It has earned an enviable reputation for high production, accuracy and dependability.

We will be glad to show you the economical advantages of having the versatile 7A-Gear Shaper in your production line. Write, wire or phone the nearest Fellows sales engineering office today.



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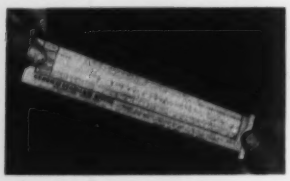
mine the weight of stainless coil steel, using as variables the coil's



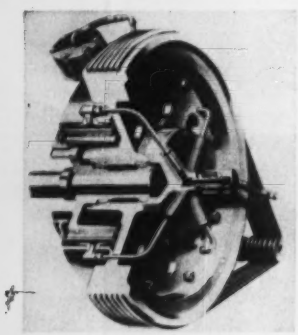
inside and outside diameters. Ulbrich Stainless Steels.

FOR MORE DATA CIRCLE REPLY CARD NO. 13

Press Package

. . . clutch and brake

This complete package is offered to users and manufacturers of open



back inclinable and straight side presses of 15 to 110 ton capacities. It features the Airflex clutch and brake and includes a flywheel mounted on anti-friction hearings, components and electro-pneumatic controls.

Cutaway view shows the type CB Airflex clutch, new flywheel and type CS spring-engaged, air-released brake. Fawick Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 14

Gravity Wheel Conveyor

. . . for bench mounting

The conveyor is easily and simply mounted on special brackets

that allow a 5 ft section in the line to be picked out with one hand for easy cleaning. Over-all height is 1⅛ in. It conveys with a small angle of decline because of extremely lightweight and easy turning wheel bearings.

It is adaptable for bench mounting in small part assembly lines either at the back of the bench where operators must reach over working areas or center installation, with operators working on both sides of the bench. Metzgar Conveyor Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 15

Refractory Gun

. . . with operating platform

The BRI Gun, Model A-20, is designed for air emplacement of granular basic refractories.

Greater simplicity, more rugged

construction and an enlarged 20 cu ft hopper capacity are listed by the manufacturer as outstanding features. An operating platform, which provides for easier loading and greater accessibility to the control panel, has been added. Basic Refractories Inc.

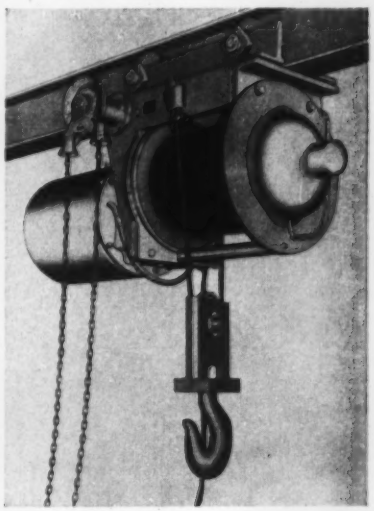
FOR MORE DATA CIRCLE REPLY CARD NO. 16

Electric Hoists

. . . 4 possible mountings

Headroom of the 8 and 10-ton hoists is about 37 in. Lift height is 15 ft and up. A choice of four mountings is offered—plain trolley, hand geared trolley, motor driven trolley and lug mounting.

Shown here is the 10-ton hoist with hand-geared trolley mounting. The load block and hook are suspended by a two-part wire rope line. The load block, carrying a shrouded ball-bearing sheave, has



its hook supported on ball bearings to permit the hook to swivel with capacity loads. R. G. LeTourneau Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 17

Rubber Gums

. . . for silicone compounds

Designated No. 81465 and No. 81447, the polymers are designed to be combined with Fine Silica Technical, developed by E. I. Dupont de Nemours & Co. They can be used with the silica to obtain maximum reinforcement. In combination with this filler they may be used to produce silicone rubber compounds with about double the tensile strength.

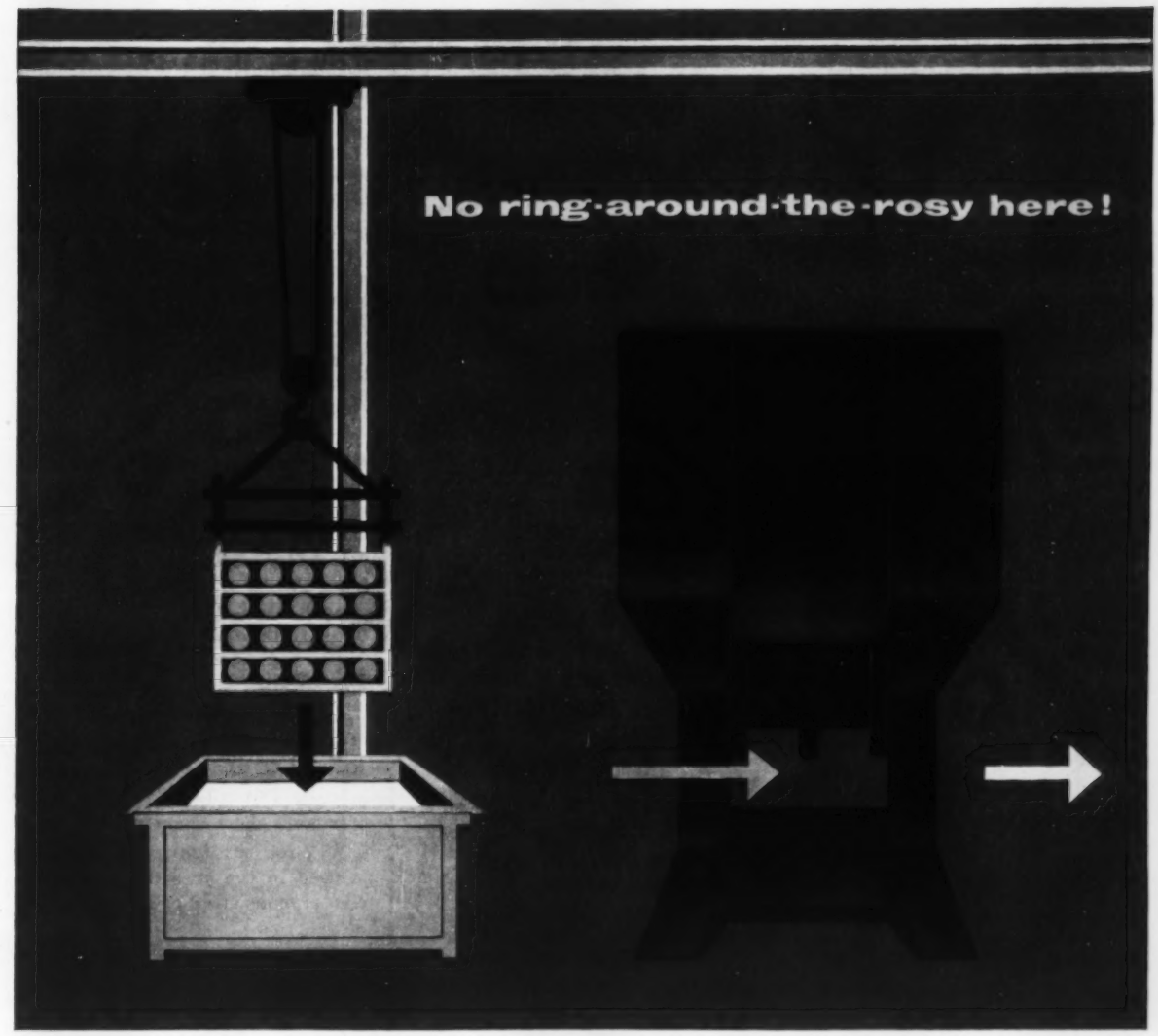
The 81465 is a gum with normal shrinkage and flexibility at minus 65 degrees. The 81477 has lower shrinkage and retains flexibility below minus 100° F. General Electric Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 18

Bin Loader

. . . for large bundles

The unit consists of a hydraulically operated loader of any length. Up to a 10,000 lb stack or bundle of material is positioned on the loader platform by fork-truck or overhead travelling crane. The loader is picked up, raised vertically and moved horizontally to the required bin. The unit is locked in front of the proper bin by a quick-attachment device. By push-



With the new Pennsalt Fos Process, cold steel can be extruded into finished shapes . . . directly . . . with important economies in manufacturing. Cold steel discs or billets are formed into shafts, cylinders, tubes, gear blanks and many other parts in the press. This eliminates up to 80% of all machining . . . creates a direct line manufacturing system that lowers costs and improves production.

The Pennsalt Fos Process is now being used in automotive, tube, wire drawing and ordnance plants. The process includes a new Pennsalt lubricant and a proven method of locking that lubricant to the steel. The Fos Process insures the smooth and rapid flow of cold steel through the die, even at extreme pressures.

Practically all the original metal can be utilized with Pennsalt cold extrusion techniques . . . work cycles can be reduced . . . and over-all production speeded up. Superior physicals can be obtained from carbon steels, along with a better, smoother finish. Multiple draws without interim recoating and annealing, and greater reductions per draw are now practical.

Is Fos Process practical for your plant . . . your products? Send us details of desired application, or blueprints of products. We will be glad to evaluate possibilities. Customer Service Department, 530 Widener Building, Philadelphia 7, Pa.

Pennsalt Chemicals

THE PENNSYLVANIA SALT MANUFACTURING COMPANY

for a fabulous finish . . .

Jewel Brand
ABRASIVE BELTS

for grinding, sanding, polishing — metal, wood, leather, plastics, rubber.

ABRASIVE PRODUCTS, INC.
511 Pearl Street
South Braintree 85
Massachusetts

NEW PRODUCTS and equipment

button, the load is moved into the bin.

The unit is designed for storage

areas where large bundles or stacks of material are received for warehouse bin storage, but are removed from the bins in small quantities. Beacon Machinery Inc.

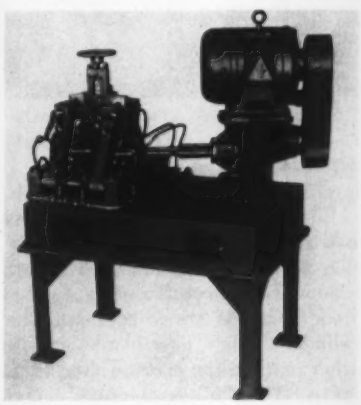
FOR MORE DATA CIRCLE REPLY CARD NO. 19

Straightener

. . . table mounted

The model OOKTC has been designed for precision straightening of rods and tubes of small diameter and short length.

A 7-roll straightening principle is used in the pass line. A 3-roll cluster, consisting of a large driven



roll with two opposed idler rolls, is located at the entry end of the machine; another identical cluster is at the delivery end. The roll arrangement provides ease of feeding, positive retention of tubing to pass line and an accurate end-to-end straightness at continuous production speeds without use of guides. Sutton Engineering Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 20

FREE LITERATURE

Catalogs and Clip Sheets

Use these reply cards to bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue.

Manufacturing Processes

A. O. Smith Corp. reveals 4 unique manufacturing processes previously restricted to military goods manufacture.

FOR A FREE COPY CIRCLE REPLY CARD NO. 21

Two-Point Presses

Cleveland Crane & Engineering Co. describes its line of Steelweld Two-Point Presses—Catalog No. 2018, 7 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 22

Air Motors, Valves

Bellows Co. illustrates and describes the dimensions and specs of its air motors and valves—Bulletin SP-50, 28 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 23

Coupling

Hansen Mfg. Co. details its quick-connective ring lock coupling, Series 3-RL.

FOR A FREE COPY CIRCLE REPLY CARD NO. 24

Sawing Equipment

Motch & Merryweather Machinery Co.'s brochure covers its circular sawing equipment—7 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 25

Conveyor Belt

H. K. Porter Co. Inc. has a chart showing engineering data for standard conveyor belt construction. It is accompanied by an engineering data sheet.

FOR A FREE COPY CIRCLE REPLY CARD NO. 26

Aluminum Data

Kaiser Aluminum & Chemical Sales Inc. has a booklet containing up-to-date information on its mill products and services—24 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 27

Power Punch Presses

Klaas Machine & Mfg. Co. describes its line of presses. Said to be capable of punching any metal that can be pierced, they are used for such operations as forming, stenciling and riveting—4 pages.

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Belt Conveyor Idler

Joy Manufacturing Co. covers its cable-suspension idler for belt conveyors—Bulletin LD-103, 4 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 29

Die Casting

American Zinc Institute Inc. describes and illustrates the die casting process and its applications in "Die Casting, Molten Metal to Finished Part"—28 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 30

Resistance Welding

Sciaky Bros. Inc.'s "Resistance Welding at Work" covers several case histories of its single phase electric resistance welding equipment—Vol 4, No. 1, 4 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 31

Certified Alloys

Cannon-Muskegon Corp. describes its custom and standard high alloys for remelt or processing uses—4 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 32

Bearings

Bound Brook Oil-less Bearing Co. lists, by size, more than 600 of the most widely used sizes of oil-retaining porous bronze bearings—Stock List No. 4, 19 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 33

Crane Control

Harnischfeger Corp. offers a booklet covering all aspects of the P & H Magnetorque crane control—Bulletin C-50, 20 pages.

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Screw Holding Accessories

Magna Driver Corp. offers a manual on magnetic screw holding

For free literature, editorial clips or more information on products described in this section, circle the corresponding number at left. Fill in box below for articles or advertisements not numbered.

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accessories for power screw drivers and nut setters—24 pages.

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Oil Burners

Thermal Research & Engineering Corp. offers a bulletin on thermal high velocity oil burners. Information includes operating principles, applications, dimensions and output data—Bulletin No. 107, 4 pages.

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Centrifugal Pumps

Falls Industries Inc. covers the six standard Impervite impervious graphite centrifugal pumps. Sizes range from 25 to 2000 gpm at 20 to 100 ft head—No. 854, 6 pages.

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Fork Trucks

Market Forge Co.'s "Why the Small Fork Truck" shows how small and medium size plants can compete with big business in materials handling efficiency — 27 pages.

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Metal Doors

Detroit Steel Products Co. offers a catalog on hollow metal doors, swing and slide—20 pages.

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Box Design

Hinde & Dauch's "Creative Package Design" is a thought provoker for users of corrugated packaging—20 pages.

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Motors

Howell Electric Motors Co. offers a bulletin on its Series 100 motors. NEMA frame data are included—Bulletin N-100, 4 pages.

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Hydraulic Valves

Lombard Corp. has a catalog on high pressure hydraulic valves—Bulletin No. 11, 30 pages.

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Band Saws

Johnson Mfg. Corp. offers a brochure covering its line of metal cutting band saws—4 pages.

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Cutting Torches

Universal Cutting and Welding Equipment Mfg. Co. describes its two types of cutting torches. One is used with acetylene, the other with propane.

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Price Selector

Lavalle & Ide Inc. offers a comparative net price selector. It features a unique arrangement of its line of reamers by decimal diameters from 0.0400 to 3.0000 in.—19 pages.

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Air Cylinders

American Society of Tool Engineers has compiled complete engineering data on 12 leading lines of air cylinders.

FOR A FREE COPY CIRCLE REPLY CARD NO. 46

EDITORIAL REPRINTS:

Vacuum Melting

Vacuum metallurgy is causing a major stir in the specialty metals industry. Reasons why can be found by turning to p. 128.

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Radiation Instruments

Here's a virtually new industry created by the atom. Zero in 1946, $30 million in 1954. That's the growth picture of the market for radiation instruments. What's more, there's a sales potential of $198 million in prospect for the next 5 years, see p. 96.

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Growth Industry

Electronic sales have climbed from $1.5 billion in 1947 to an estimated $8 billion this year. And volume may hit $12 billion by 1960. For the details and other reasons why electronics are a fertile field for a new or expanding company, see p. 85.

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Cast Ferrous Metals

Part one of a four part series begins on p. 158. Know-how is the key to the proper use of castings. This article offers you an analysis of the ferrous types to consider and specifications to cover them.

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7	17	27	37	47	57	67	77	87
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STEEL
November 15, 1954

Market Outlook

STEEL INGOT production reached a new high for the year.

In the week ended Nov. 14 it climbed to 77.5 per cent of capacity. This is the highest level since the week ended last Dec. 20. In its current rise, the rate moved up 2 points over the preceding week.

The production peak comes after a slow but steady climb since mid-July, a trend in direct contrast to that of last year. In the last half of 1953, steel ingot output was going down.

SOLID—There are good reasons to believe the increased rate is not a "flash in the pan." Lending solidity to the outlook are: 1. Lowered inventories of steel. 2. Strong expectations for the automotive and construction industries—the two biggest users of steel. 3. Forecasts that business in general will be a little better next year.

The U. S. automobile industry is starting to live up to expectations. It expects to set a record for November by producing 509,000 passenger cars. Output in November, 1953, was only 361,815 units.

BOOSTERS—The rise in steel demand comes not only from the automobile industry but also from appliance makers and the farm equipment industry.

Many metalworking companies are being forced to increase their steel purchases even though their sales are only steady. They've lived up their inventories of steel as far as is safe. They have to buy at least as much steel as they are currently consuming.

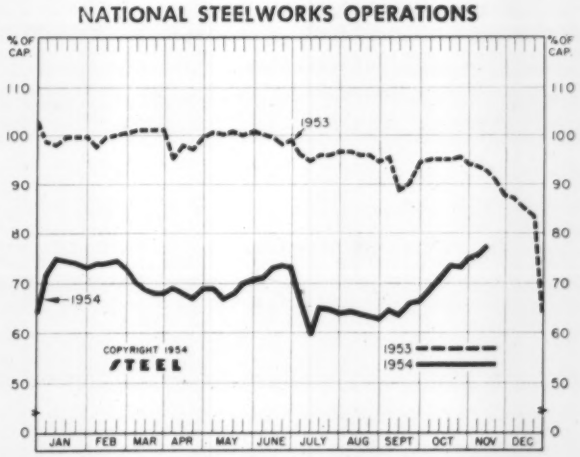
EXTENDED BUYING—As steel demand strengthens, buyers feel compelled to buy farther ahead to protect themselves in early 1955. Already, some producers of cold-rolled carbon steel sheets are booked into the first quarter.

ABOVE CAPACITY—To meet the renewed demand for steel, particularly cold-rolled sheets, some producers are operating at or above theoretical capacity. One Midwest mill making that product set a 1954 record for itself last week by producing ingots at 110 per cent of capacity.

MIXED REACTION—Not all forms of finished steel are feeling the upturn in demand. Plates are sluggish, largely because of the lethargy in railroad carbuilding and shipbuilding. You can get plates in two weeks or less. Hot-rolled and cold-finished bars and hot-rolled sheets are in easy supply, too. Nevertheless, steel demand is strong enough that prices are steady. STEEL's arithmetical price composite on finished steel continues at $117.95 a net ton.

FORMULA FOR SCRAP—Also steady is STEEL's price composite on steelmaking scrap. It is $33.67 a gross ton. For quite a few weeks, scrap prices were pushed up by export demand—a demand sufficiently strong to touch off a fight in Washington. Domestic scrap users want exports of it halted. Headed for the Commerce department is a scrap export formula. Its base would be like this: When steel ingot output is at 75 per cent of capacity, 1 million tons of scrap could be exported. A drop in ingot output below 75 per cent would allow scrap exports to increase over the 1-million-ton base. A rise in ingot output over 75 per cent would cut scrap exports below 1 million tons.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended Nov. 14	Change	Same Week 1953	Same Week 1952
Pittsburgh	74	+ 0.5*	88.5	103
Mid-Atlantic	70	0	94	99
Chicago	81.5	+ 2.5*	98	111.5
Youngstown	76	+ 2	96	106
Wheeling	91.5	+10.5	99	100.5
Cleveland	90	+ 3*	98.5	114.5
Buffalo	95.5	+ 5.5	106.5	106.5
Birmingham	64	0	96.5	105.5
New England	59	0	85	88
Cincinnati	75	— 1.5	68	94
St. Louis	87	— 3	89	98
Detroit	80	0	97.5	106
Western	86	0	100	104
National Rate	77.5	+ 2	92.5	106

INGOT PRODUCTION‡

	Week Ended Nov. 14	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	114.7†	113.4	108.0	129.5
NET TONS (In thousands)	1,842†	1,822	1,735	2,081

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,384,549 in 1954; 2,254,459 in 1953; 2,077,040 in 1952.

Metalworking Outlook—p. 77 Technical Outlook—p. 127

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Nov. 9 1954	Nov. 2 1954	Month Ago	Oct. Average
(1947-1949=100)	144.7	144.7	144.7	144.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Nov. 9

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.525	Sheets, electrical	$9.350
Rails, light, 40 lb	5.917	Strip, C.R., carbon	7.507
Tie Plates	5.275	Strip, C.R., stainless, 430 (lb)	0.415
Axles, railway	7.500	Strip, H.R., carbon	5.125
Wheels, freight car, 33 in. (per wheel)	48.500	Pipe, black, buttweld (100 ft)	15.000
Plates, carbon	4.675	Pipe, galv., buttweld (100 ft)	18.605
Structural Shapes	4.517	Pipe, line (100 ft)	146.804
Bars, tool steel, carbon (lb)	0.430	Casing, oil well, carbon (100 ft)	154.216
Bars, tool steel, alloy, oil hardening die (lb)	0.525	Casing, oil well, alloy (100 ft)	227.875
Bars, tool steel, H.R., alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.115	Tubes, boiler (100 ft)	‡
Bars, tool steel, H.R., alloy, high speed W 18, Cr 4, V 1 (lb)	1.610	Tubing, mechanical, carbon	‡
Bars, H.R., alloy	8.775	Tubing, mechanical, stainless, 304 (100 ft)	161.193
Bars, H.R., stainless, 303 (lb)	0.418	Tin plate, hot-dipped, 1.25 lb	8.533
Bars, H.R., carbon	5.000	Tin plate, electrolytic, 0.25 lb	7.233
Bars, reinforcing	5.050	Black plate, can making quality	6.333
Bars, C.F., carbon	8.160	Wire, drawn, carbon	7.938
Bars, C.F., alloy	11.275	Wire, drawn, stainless, 430 (lb)	0.545
Bars, C.F., stainless, 302 (lb)	0.433	Bale ties (bundle)	5.860
Sheets, H.R., carbon	4.880	Nails, wire, 8d common	7.815
Sheets, C.R., carbon	5.871	Wire, barbed (80-rod spool)	7.109
Sheets, galvanized	7.220	Woven wire fence (20-rod roll)	16.815
Sheets, C.R., stainless, 302 (lb)	0.548		

‡Not available.

STEEL's FINISHED STEEL PRICE INDEX*

	Nov. 10 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	194.53	194.53	194.53	189.38	152.52
Index in cents per lb.	5.270	5.270	5.270	5.130	4.132

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$117.95	$117.95	$117.95	$115.18	$91.64
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	56.54	46.10
Basic Pig Iron, GT	56.04	56.04	56.04	56.04	45.60
Malleable Pig Iron, GT	57.27	57.27	57.27	57.27	47.27
Steelmaking Scrap, GT	33.67	33.67	32.00	35.23	28.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Nov. 10 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.30	4.30	4.30	4.15	3.35
Bars, H.R., Chicago	4.30	4.30	4.30	4.15	3.35
Bars, H.R., deld. Philadelphia	4.55	4.55	4.55	5.302	3.83
Bars, C.F., Pittsburgh	5.40	5.40	5.40	5.20	3.95-4.00
Shapes, Std., Pittsburgh	4.25	4.25	4.25	4.10	3.25
Shapes, Std., Chicago	4.25	4.25	4.25	4.10	3.25
Shapes, deld., Philadelphia	4.53	4.53	4.53	4.38	3.50
Plates, Pittsburgh	4.225	4.225	4.225	4.10	3.40
Plates, Chicago	4.225	4.225	4.225	4.10	3.40
Plates, Coatesville, Pa.	4.225	4.225	4.225	4.35	3.50
Plates, Sparrows Point, Md.	4.225	4.225	4.225	4.10	3.40
Plates, Claymont, Del.	4.225	4.225	4.225	4.55	3.50
Sheets, H.R., Pittsburgh	4.05	4.05	4.05	3.925	3.25
Sheets, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Sheets, C.R., Pittsburgh	4.95	4.95	4.95	4.775	4.00
Sheets, C.R., Chicago	4.95	4.95	4.95	4.775	4.00
Sheets, C.R., Detroit	5.10	5.10	5.10	4.975	4.20
Sheets, Galv., Pittsburgh	5.45	5.45	5.45	5.275	4.40
Strip, H.R., Pitts.	4.05	4.05	4.05	4.025	3.25
Strip, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Strip, C.R., Pittsburgh	5.75	5.75	5.75	5.45-5.95	4.00
Strip, C.R., Chicago	5.85	5.85	5.85	5.70	4.00-4.15
Strip, C.R., Detroit	5.60-.90	5.60-.90	5.60-.90	5.45-6.05	4.20-.25
Wire, Basic, Pitts.	5.75	5.75	5.75	5.475-5.525	4.15
Nails, Wire, Pittsburgh	6.85	6.85	6.85	6.35-6.55	5.15
Tin plate (1.50 lb), box, Pitts.	$9.05	$9.05	$9.05	$8.95	$7.75
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$78.00	$78.00	$78.00	$75.50	$61.00
Wire rods, ⅜-⅝" Pitts.	4.675	4.675	4.675	4.525	3.40
PIG IRON, Gross Ton					
Bessemer, Pitts.	$57.00	$57.00	$57.00	$57.00	$47.00
Basic, Valley	56.00	56.00	56.00	56.00	46.00
Basic, deld. Phila.	59.66	59.66	59.66	60.75	49.44
No. 2 Fdry, Pitts.	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Valley	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, deld. Phila.	50.16	50.16	50.16	61.25	49.94
No. 2 Fdry, Birm.	52.88	52.88	52.88	52.88	39.38
No. 2 Fdry (Birm.) deld. Cin.	60.58	60.58	60.58	60.43	46.08
Malleable, Valley	56.50	56.50	56.50	56.50	46.50
Malleable, Chicago	56.50	56.50	56.50	56.50	46.50
Ferromanganese, Duquesne	190.00†	190.00†	190.00†	200.00†	175.00*

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pitts.	$34.50	$34.50	$32.50	$37.50	$29.50
No. 1 Heavy Melt, E. Pa.	33.50	33.50	30.50	35.00	25.00
No. 1 Heavy Melt, Chicago	33.00	33.00	33.00	35.50	28.50
No. 1 Heavy Melt, Valley	35.50	35.50	35.00	35.50	32.75
No. 1 Heavy Melt, Cleve.	33.50	33.50	32.00	33.50	30.25
No. 1 Heavy Melt, Buffalo	31.50	31.50	30.50	34.50	27.25
Rails, Rerolling, Chicago	54.50	54.50	52.50	45.00	44.50
No. 1 Cast, Chicago	39.50	39.50	39.50	33.50	41.50
COKE, Net Ton					
Beehive, Furn, Connlsvl.	$13.75	$13.75	$13.75	$14.75	$13.25
Beehive, Fdry, Connlsvl.	16.75	16.75	16.75	16.75	15.75
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	20.00

Daily Nonferrous Price Record

	Price Nov. 10	Last Change	Previous Price	Oct. Avg.	Sept. Avg.	Nov. 1953 Avg.
Copper	30.00	Apr. 12	29.75-30.00	30.000	30.000	29.606
Lead	14.80	Oct. 4	14.55	14.775	14.400	13.300
Zinc	11.50	Sept. 3	11.00	11.500	11.900	10.000
Tin	90.00	Nov. 10	90.75	93.110	93.545	81.096
Nickel	60.00	Jan. 14, 1953	56.50	60.000	60.000	60.000
Aluminum	22.20	Aug. 5, 1954	21.50	22.200	22.200	21.500
Magnesium	27.00	Mar. 9, 1953	24.50	27.000	27.000	27.000

Quotations in cents per pound based on: Copper, deld. Conn. Valley; Lead, commond grade, deld. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, deld. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99+ %, deld.; Magnesium 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

How HOUGHTON Helps Produce STEEL

You may know Houghton for its Hydraulic Department, where moulded packings have been made for two generations, and used by practically every steel producer. Current types include leather, synthetic rubber and the new rubber-impregnated leather (VIM 1243) that is taking industry by storm.

Or, you may know Houghton as a maker of specialty lubricants, fortifying petroleum oils and greases to do vastly improved lubrication jobs . . . open gears, hot spots, lube additives for water systems or for fuel oils . . . scores of items for hundreds of specialized applications.

And it is possible that your knowledge of Houghton has been based largely on its metal-working products: rust preventives, heat treating and quenching oils, cutting oils and bases, pickling inhibitors, hot top insulating materials, hot forging agents.

But no matter how you classify this 89-year-young Company, it is certain that Houghton products can be of aid. Behind them is a definite plus value—a field and laboratory service unequalled in our type of industry—also helpful, authoritative publications and manuals highly regarded by metal men.

Get to know Houghton better.
Write for bulletin "Houghton Serves the Steel Industry."
E. F. HOUGHTON & CO.
303 W. Lehigh Ave., Phila. 33, Pa.

E. F. HOUGHTON & CO.
PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .

Nonferrous Metals

Nearly all basic metals show a strong upward trend. It's a result of government stockpiling and a rise in consumption by industry

Nonferrous Metal Prices, Pages 206 & 207

THE ZINC MARKET is rising from the depths and may be fully on its feet before spring.

For five consecutive months to November, industry stocks have tumbled consistently, are now at a fairly respectable 152,137 tons. While this hasn't been a bootstrap recovery —government dredging of surplus metal for stockpile is the key factor —consumption by industry has perked up decidedly.

Widespread—A 22 per cent spurt in domestic shipments during October hit a high in deliveries that hadn't been reached since November, 1952. The 78,867 tons shipped, added to 10,080 tons for government account and 1468 tons for export and drawback, meant a total stock reduction of 23,400 tons, surprising even the industry experts.

Domestic production gained 6910 tons to 67,047 tons, reflecting resumption of operations at Anaconda's Montana plant Oct. 10 after a six-week strike. Stocks entering November are lowest since September, 1953. Unfilled orders (51,559 tons) are highest since March, 1953.

Across the Board—What's happening in zinc is an indication of the strong upward trend in nearly all basic metals . . . manufacturers are using more and ordering more. Sharp reduction (nearly 24 per cent) in stocks of special high grade zinc points to big die caster demand from automotive and appliance fields. Prime western stocks (dipping 9 per cent in one month) underline the continuing boom market for galvanized steel. Brass mills are taking in more zinc, too, as the pipeline of copper supplies refills.

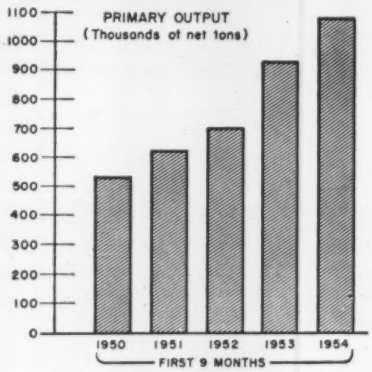
Nonferrous metals react to general business conditions in many respects as does steel, and steel production is at new 1954 highs (see p. 201).

Aluminum Sets Record

Third-quarter aluminum output hit another quarterly high at 371,791 tons. September shipments of semi-fabricated products showed gains from August in drawn tube, rod and bar, ACSR and bare cable, forgings and sand and die castings. Losses were recorded by sheet and plate, foil, extrusions, wire other than conductor and permanent mold castings. Census Bureau figures set total shipments of aluminum products in September at 183 million lb, about equal to August. Magnesium mill products gained 6 per cent from August to 1,183,000 lb, says the bureau.

Aluminum . . .

Light Metal Makes Heavy Gains



Source: U.S. Bureau of Mines.

Silicon Price Declines

Fifty dollars a pound price reduction in pure metallic silicon was made effective Nov. 1 by Du Pont. New level is $380 a pound, but the company hopes to lower prices further as volume increases with the growth of electronics, particularly transistors, diodes and rectifiers. Du Pont last week put into operation new facilities for manufacturing commercially pure silicon.

Magnesium Price Cut

Another significant price reduction came in magnesium last week. Dow Chemical Co. snipped one cent from the base price of AZ91B die casting ingot, effective Nov. 8. The company also is giving freight allowance at the carload rate, which means about a 2 cent, or 7 per cent, cut. The beryllium-containing alloy is now in a more attractive competitive position, and die casters, already enthusiastic about mag's possibilities in their field, are bound to redouble efforts to develop longer-life die materials and improve production techniques.

Imports Taper

Imports of aluminum and brass mill products are on the wane. Not long ago brass plumbing tube from abroad sold at a 14-15 cent differential from U. S. mill prices. Copper strikes hurt because markets abroad demanded more of the goods and the differential has narrowed to 7-8 cents a pound today. Dock strikes held up metal and fabricators were swamped with delayed orders when unloading resumed. Alloys are correct on the imported goods, say fabricators, but temper is not always right. In bending temper and grain size must be right or scrap losses from fabrication will offset the lower initial price.

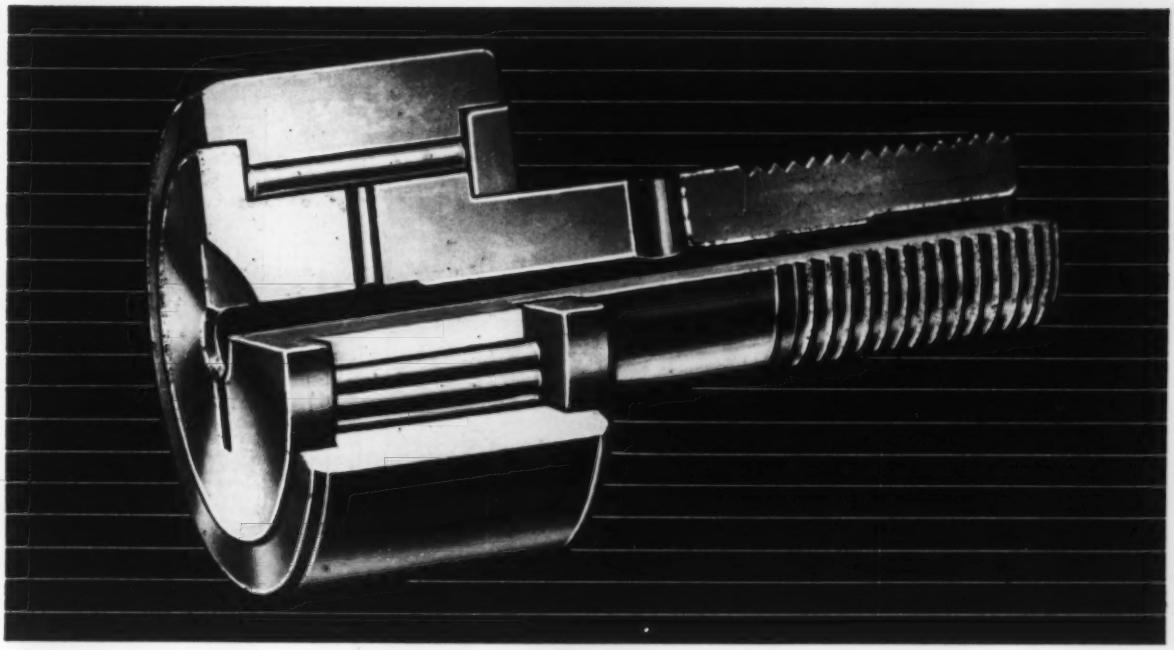
Aluminum goods, mostly sheet, sell for from 1 to 3 cents per pound less on mill shipments from abroad. Germany, France, England and Italy are sending aluminum here, but volume is not large enough at this time to worry domestic mills.

More Copper—Maybe

One of the top ten copper deposits in the world, American Smelting & Refining Co.'s Toquipala project in southern Peru, may be expanded with a $100 million Export-Import Bank loan. A total of $205 million is needed to finance development. The property would be capable of turning out 140,000 tons of blister copper yearly for 10 years and then taper off to about 90,000 tons as copper content of ore decreases. The U. S. government would have option to buy part of the output upon notice.

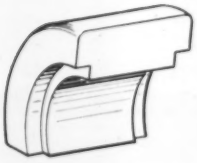
Market Memos

- First forging press built under the Air Force heavy press program is nearing completion in Cleveland, says Alcoa.
- Secondary aluminum ingot prices moved up a quarter-cent in midwest markets last week and are expected to stick through the month at least.
- Five per cent wage increase and a number of fringes were included in the one-year contract initiated by CIO-USA with Kennecott Copper Corp. and American Smelting & Refining Co.



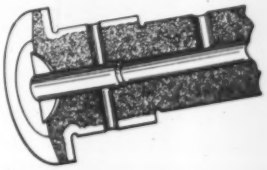
TORRINGTON CAM FOLLOWERS

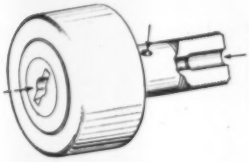
Give Longer Service... Carry High Shock Loads



1. Heavy sectioned outer race of hardened and ground high carbon chrome steel assures uniform distribution of high rolling and shock loads while providing high capacity anti-friction performance.

2. Integral stud for cantilever mounting is made of case hardened and ground low carbon nickel molybdenum steel. The tough core provides high strength to withstand high shock loads.

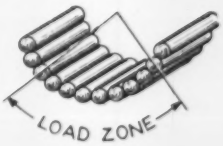


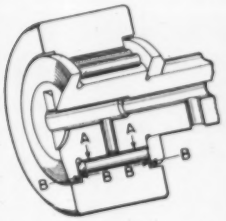


3. Easily relubricated at any one of three points—at either end or through cross hole in stud. Ends accommodate standard drive grease fittings, or may be sealed by the plugs provided.

District Offices and Distributors in Principal Cities of United States and Canada

4. Full complement of small diameter rollers—through-hardened, ground and lapped—for maximum radial load capacity.





5. Raceways precision ground for even load distribution (A) and uniform low end play (B) assure long bearing life.

Torrington Cam Followers are precision made throughout. They are available in sizes from ½" to 2¼" O.D. Special surface finishes such as chrome and cadmium plate or oxide black can be provided.

Our Engineering Department will be glad to work with you in adapting these dependable and efficient Cam Followers to your cam-controlled or track-type equipment. Torrington Cam Followers give better service because they're better made.

THE TORRINGTON COMPANY

Torrington, Conn. **South Bend 21, Ind.**

TORRINGTON *NEEDLE* **BEARINGS**

Needle • Spherical Roller • Tapered Roller • Cylindrical Roller • Ball • Needle Rollers

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 22.20, pigs 20.50 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 24; No. 43, 5% Si, 23.8; No. 142, 4% Cu, 25.1; No. 195, 4.5% Cu, 0.8% Si, 24.5; No. 214, 3.8% Mg, 25.2; No. 356, 7% Si, 0.3% Mg, 23.9.

Antimony: R.M.M. brand, 99.5% 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.; Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg; $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 30.00 deld. Conn. Valley, 30.00 deld. Midwest; Lake 30.00 deld.; Fire refined 29.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $145-$150 per troy oz.

Lead: Common 14.80, chemical 14.90, corroding 14.90, St. Louis; N. Y. basis, add 0.20.

Lithium: 98%, $11-$14 per lb, depending on quantity.

Magnesium: 99.8%, self-palletizing pig 27.00; notched ingot 27.75, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., and Madison, Ill., add 1.20 for pig and 1.25 for ingot. Sticks, 1.3 in. diameter, 46.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more f.o.b. Freeport, Tex., or Madison, Ill. Add 1.20 for Port Newark, N. J.

Mercury: Open market, spot, New York, $320-$320-$325, per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3.40 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked 60.00; 25-lb pigs 62.65; "XX" nickel shot 63.65; "F" nickel shot or ingots for addition to cast iron, 60.00; prices f.o.b. Port Colborne, Ont., including import duty, New York basis, add 0.92.

Osmium: $140-$150 per troy oz nom.

Palladium: $21 per troy oz.

Platinum: $84-$87 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $125 per troy oz.

Ruthenium: $75-$80 per troy oz.

Selenium: 99.5%, $5-$6 per lb.

Sodium: 16.50, carlots; 17.00 l.c.l.

Tantalum: Sheet, rod $39.00 per lb; powder $33.50 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot 90.00, prompt 89.875.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max) $4.72; grade A-2 (0.5% Fe max) $4.46 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000 lb lots $4.95 per lb, f.o.b. shipping point; less than 1000 lb $5.10 99+% hydrogen reduced, $4.65. Treated ingots $6.70.

Zinc: Prime Western 11.50, brass special 11.75, intermediate 12.00, E. St. Louis, freight allowed over 0.50 per pound. High grade 12.85, special high grade 13.00, die casting alloy ingot 15.50, deld.

Zirconium: Sponge $10 per lb; powder electronics grade $15, flash grade $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloy 21.25-21.75; No. 12 foundry alloy (No. 2 grade) 20.25-20.75; 5% silicon alloy, 0.60 Cu max., 23.75-24.00; 13 alloy, 0.60 Cu max., 23.75-24.00; 195 alloy 21.75-22.75; 108 alloy 20.75-21.25; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 21.50-22.00; grade 2, 20.50-21.00; grade 3, 19.50-20.00; grade 4, 18.50-19.00.

Brass Ingot: Red brass, No. 115, 29.50; tin bronze No. 225, 41.00; No. 245, 34.75; high-leaded tin bronze, No. 305, 34.00; No. 1 yellow, No. 405, 25.25; manganese bronze No. 421, 27.75.

Magnesium Alloy Ingot: AZ63A, 31.50; AZ91B, 26.00; AZ91C, 31.50; AZ92A, 31.50.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy.) Strip, $1.68; rod, bar, wire, $1.65.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof, 100,000 lb, 36.28; 30,000 lb. 36.53; l.c.l. 37.03. Magnet wire deld., 15,000 lb or more 41.83; l.c.l. 42.58.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more $20.00 per cwt; pipe, full coils $20.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $11; forging billets $6; hot-rolled and forged bars, $6.

ZINC

(Prices per lb c.l., f.o.b. mill) Sheets 23.00, ribbon zinc in coils, 18.50-20.50; plates 18.00-22.25.

ZIRCONIUM

Plate $27; H.R. strip $28; C.R. strip $35; forged or H.R. bars $27; wire, 0.015 in., 1 cent per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R.	86.5	67.5	92.5
Strip, C.R.	92.5	70.5	98.5
Plate, H.R.	84.5	66.5	90.5
Rod, Shapes	82.5	65.5	88.5
Seamless Tubes	115.5	100.5	137.5
Shot, Blocks		60.0	

ALUMINUM*

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	—Round— 2011-T3	2017-T4	—Hexagonal— 2011-T3	2017-T4
Drawn				
0.125	62.5	61.0	...	...
0.156-0.172	52.9	51.3	...	...
0.188	52.9	51.3	...	65.8
0.219-0.234	50.1	48.5	...	...
0.250-0.281	50.1	48.5	...	62.7
0.313	50.1	48.5	...	59.8
Cold-finished				
0.375-0.547	48.9	46.5	58.8	56.2
0.563-0.688	48.9	46.5	55.9	52.7
0.750-1.000	47.7	45.3	51.1	49.6
1.063	47.7	45.3	...	47.9
1.125-1.500	45.9	43.6	49.4	47.9
Rolled				
1.563	44.7	42.4	...	...
1.625-2.000	44.1	41.8	...	46.2
2.125-2.500	43.0	40.7	...	...
2.563-3.375	41.7	39.5	...	...

ALUMINUM*

Sheets and Circles: 1100 and 3003 mill finish c.l. (30,000 lb base; freight allowed over 499 lb)

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	12-49	34.9	...	...
0.135-0.096	12-48	35.4	...	...
0.095-0.077	12-48	36.1	33.6	38.6
0.076-0.061	12-48	36.7	33.8	38.8
0.060-0.048	12-48	37.2	34.1	39.2
0.047-0.038	12-48	37.7	34.6	39.6
0.037-0.030	12-48	38.1	35.0	40.3
0.029-0.024	12-48	38.7	35.3	40.8
0.023-0.019	12-36	39.4	36.1	41.6
0.018-0.017	12-36	40.2	36.7	42.5
0.016-0.015	12-36	41.1	37.5	43.7
0.014	12-24	42.1	38.5	45.0
0.013-0.012	12-24	43.3	39.2	46.0
0.011	12-24	44.3	40.4	47.6
0.010-0.0095	12-24	45.5	41.5	49.2
0.009-0.0085	12-24	46.8	43.0	51.3
0.008-0.0075	12-24	48.4	44.2	53.1
0.007	12-18	49.9	45.7	55.4
0.006	12-18	51.5	47.1	60.4

*72-180 in. lengths. †26 in. max. dia.

ALUMINUM*

Plates and Circles: Thickness 0.250-3.0 in., 24-60 in. width or dia, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	34.7	38.9
5050-F	34.7	38.9
3004-F	35.7	40.6
5052-F	37.4	42.4
6061-T6	38.6	43.0
2024-T4*	40.8	46.9
7075-T6*	48.6	55.2

*24-48 in. widths or dia., 72-180 in. lengths

ALUMINUM*

Forging Stock: Round, Class 1, 46.8-36.3 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 52.6-40 in. random lengths 0.375-4.0 in. thick, widths 0.750-10.0 in.

Pipe: A.S.A. Schedule 40, alloy 6063-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size, in.		Nom. pipe size, in.	
¾	$15.70	2	$ 48.30
1	24.75	4	132.90
1¼	23.50	6	238.35
1½	40.05	8	358.60

*Alloy designations are standard for use on and after Oct. 1, 1954. To relate them to designations used prior to that time, see STEEL, Aug. 9, 1954, p. 95.

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 94.00, 0.064-in. 73.00, 0.125-in. 60.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot rolled AZ31, 53.00, 20,000 lb or more 0.250-in. and over, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 59.00, 20,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in., 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ¼-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 28 clippings 14.50; low copper clippings 14.50; mixed clippings 12.50; old sheet 11.00; borings and turnings 7.50; pistons and struts 8.00; crankcases 11.00; industrial castings 11.00.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.38b	45.95c	....	48.44	26.000	26.000	25.250
Yellow Brass	41.72	34.50d	42.26	44.63	19.750	19.500	18.000
Red Brass, 85%	45.44	45.38	45.98	48.25	23.000	22.750	22.250
Low Brass, 80%	44.47	44.41	45.01	47.28	22.125	21.875	21.375
Naval Brass	45.76	40.07	52.80	48.92	18.250	18.000	17.500
Commercial Bronze, 90%	46.95	46.89	47.49	49.51	23.875	23.625	23.125
Nickel Silver, 10%	55.36	59.43g	57.69	....	23.625	23.375	11.813
Phosphor Bronze, A, 5%	66.58	67.08	67.08	68.23	26.125	25.875	24.875
Silicon Bronze	52.71	51.90	52.75	70.11e	25.125	24.875	24.125
Manganese Bronze	49.48	43.62	54.06	....	18.250	18.000	17.500
Muntz Metal	43.96	39.77	....	....	18.625	18.375	17.875

a. Cents per lb f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Copper and Brass: Heavy copper and wire, No. 1 25.50; No. 2 copper 24.50; light copper 22.50; No. 1 composition red brass 20.00; No. 1 composition turnings 19.50; mixed brass turnings 14.00; new brass clippings 18.00; No. 1 brass rod turnings 15.00; light brass 12.50; heavy yellow brass 15.50; new brass rod ends 16.00; auto radiators, unsweated 17.00; cocks and faucets 17.00; brass pipe 17.50.

Lead: Heavy 11.75-12.00; battery plate 6.25-6.50; linotype and stereotype 13.75-14.00; electrotype 12.00-12.50; mixed babbitt 12.50-13.00.

Magnesium: Clippings 18.50-19.50; clean castings 17.50-18.50; iron castings, not over 10% removable Fe, 16.50-17.50.

Monel: Clippings 23.00-25.00; old sheet 21.00-23.00; turnings 16.00-18.00; rods 23.00-25.00.

Nickel: Sheets and clips 60.00-65.00; rolled anodes 60.00-65.00; turnings 40.00; rod ends 60.00-65.00.

Tin: No. 1 pewter 55.00-60.00; block tin pipe 75.00-80.00; No. 1 babbitt 50.00.

Zinc: Old zinc, 5.00-5.25; new die cast scrap, 4.75-5.00; old die cast scrap, 3.25-3.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 2S, 3S clippings 16.00-16.25; 51S, 52S clippings 16.00-16.25; 14S, 17S, 24S clippings 15.25-15.50; mixed clipping 14.75-15.00; old sheet 14.00-14.25; old cast 14.00-14.25; clean old cable, free of steel 16.00-16.25; borings and turnings 14.25-14.75.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Copper, Brass: No. 1 copper 28.50; No. 2 copper 27.00; light copper 25.50; refinery brass (60% copper) per dry copper content 25.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 27.75; No. 2 copper 26.25; light copper 24.75; No. 1 composition borings 22.75; No. 1 composition solids 23.00; heavy yellow brass solids 18.00; yellow brass turnings 17.00; radiators 18.75.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.70 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 5000-10,000 lb; electrodeposited 39.78, cast 42.04, 2000-5000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.05; 200-499 lb $1.09; 500-999 lb $1.085; 1000 lb or more $1.08.

Zinc: Bar 20.00, bar or flat top 19.00 ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb. in 100 lb drums.

Chromic Acid: Less than 10,000 lb 28.50; over 10,000 lb 27.50.

Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.

Copper Sulphate: 100-6000 lb 11.35; 6000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 25,000 oz and over 77.325.

Sodium Cyanide: Egg, under 1000 lb 19.80; 1000-19,900 lb 18.80; 20,000 lb and over 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb 70.6; 100-600 lb 56.3; 700-1900 lb 53.9; 2000-9900 lb 52.1; 10,000 lb or more 51.

Stannous Chloride: (Anhydrous): Less than 50 lb $1.564; 50 lb $1.224; 100-300 lb $1.074; 400-900 lb $1.049; 100-1900 lb $1.025; 2000-4900 lb 98.8; 5000-19,000 lb 92.7; 20,000 lb and over 86.6.

Stannous Sulphate: Less than 5 lb $1.264; 50 lb 96.4; 100-1900 lb 94.4; 2000 lb and over 92.4.

Zinc Cyanide: Under 1000 lb 54.30, 1000 lb and over 52.30.

LOOK TO DETREX FOR Service WITH A Saving

DETREX
puts your metal cleaning in-line for lower costs

Today with specialized Detrex equipment, *all* your metal washing and degreasing operations can be performed right in sequence on your production line. Regardless of the size of the work, the type of soil to be removed or the kind of cleaning required, Detrex can provide a unit exactly for the job.

Detrex equipment for "in-line" degreasing and washing provides the efficiency of decentralized cleaning and eliminates plant-wide trucking required with centralized cleaning. It further eliminates the confusion connected with interdepartmental handling and the possibility of damage to precision-machined parts. Because Detrex equipment is designed for production-line use, you'll find it operates at lower cost-per-piece-cleaned, too.

In fact, *only* Detrex makes both the equipment and the chemicals for *all* types of cleaning . . . alkaline and emulsion washing, solvent degreasing, even cleaning by sound waves*!

Detrex field technicians, well schooled in efficient materials handling, will gladly survey your cleaning operations and give you specific recommendations on equipment and the results we guarantee to you. There is no charge, it's a part of Detrex service . . . the Service with a Saving! Get specific facts for your plant by using the coupon below.

*Detrex Soniclean® Process

We'd like complete data on Detrex equipment for our production line and the savings you guarantee it to produce.

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COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

DETREX CORPORATION

DEPT E-201, BOX 501, DETROIT 32, MICH.

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on page 209. Key to footnotes, page 211.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$61.50

INGOTS, Alloy (NT)
Detroit R7 .....$65.00
Houston S5 .....73.00
Midland,Pa. C18 .....65.00
Munhall,Pa. U5 .....65.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)
Aliquippa,Pa. J5 ....$64.00
Bessemer,Pa. U5 .....64.00
Buffalo R2 .....64.00
Clairton,Pa. U5 .....64.00
Ensley,Ala. T2 .....64.00
Fairfield,Ala. T2 .....64.00
Fontana,Calif. K1 ....72.00
Gary,Ind. U5 .....64.00
Johnstown,Pa. B2 .....64.00
Lackawanna,N.Y. B2 ..64.00
Munhall,Pa. U5 .....64.00
So.Chicago,Ill. R2,U5 ..64.00
So.Duquesne,Pa. U5 ...64.00
Youngstown R2 .....64.00

Carbon, Forging (NT)
Aliquippa,Pa. J5 ....$78.00
Bessemer,Pa. U5 .....78.00
Buffalo R2 .....78.00
Canton,O. R2 .....80.00
Clairton,Pa. U5 .....78.00
Conshohocken,Pa. A3 ..83.00
Ensley,Ala. T2 .....78.00
Fairfield,Ala. T2 .....78.00
Fontana,Calif. K1 ....86.00
Gary,Ind. U5 .....78.00
Geneva,Utah C11 ....78.00
Houston S5 .....85.00
Johnstown,Pa. B2 ....78.00
Lackawanna,N.Y. B2 ..78.00
LosAngeles B3 .....87.50
Munhall,Pa. U5 .....78.00
Seattle B3 .....91.50
So.Chicago R2,U5,W14 .78.00
So.Duquesne,Pa. U5 ...78.00
So.SanFrancisco B3 ...87.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 .....$86.00
Buffalo R2 .....86.00
Canton,O. R2, T7 ....86.00
Conshohocken,Pa. A3 ..93.00
Detroit R7 .....86.00
Fontana,Calif. K1 ....105.00
Gary,Ind. U5 .....86.00
Houston S5 .....93.00
Ind.Harbor,Ind. Y1 ...86.00
Johnstown,Pa. B2 ....86.00
Lackawanna,N.Y. B2 ..86.00
LosAngeles B3 .....106.00
Massillon,O. R2 .....86.00
Midland,Pa. C18 .....86.00
Munhall,Pa. U5 .....86.00
So.Chicago, R2,U5,W14 .86.00
So.Duquesne,Pa. U5 ...86.00
Struthers,O. Y1 .....86.00
Warren,O. C17 .....86.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$96.50
Canton,O. R2 .....96.50
Cleveland R2 .....96.50
Gary,Ind. U5 .....96.50
So.Chicago R2, W14 ..96.50
So.Duquesne,Pa. U5 ...96.50

SKELP
Aliquippa,Pa. J5 .....4.00
Fontana,Calif. K1 .....4.775
Munhall,Pa. U5 .....3.90
Warren,O. R2 .....3.90
Youngstown R2, U5 ....3.90

WIRE RODS
AlabamaCity,Ala. R2 ..4.675
Aliquippa,Pa. J5 .....4.675
Alton,Ill. L1 .....4.85
Buffalo B11, W12 ....4.675
Cleveland A7 .....4.675
Donora,Pa. A7 .....4.675
Fairfield,Ala. T2 .....4.675
Fontana,Calif. K1 ....5.475
Houston S5 .....5.075
IndianaHarbor,Ind. Y1 .4.675
Johnstown,Pa. B2 ....4.675
Joliet,Ill. A7 .....4.675
KansasCity,Mo. S5 ....5.015
Kokomo,Ind. C16 .....4.775
LosAngeles B3 .....5.475
Minnequa,Colo. C16 ...4.925
Monessen,Pa. P7 .....4.675
No.Tonawanda,N.Y.B11 4.675
Pittsburg,Calif. C11 ..5.325
Portsmouth P12 .....4.675
Roebling,N.J. R5 .....4.775
So.Chicago,Ill. R2 ....4.675
Sterling,Ill.(1) N15 ....4.675
Sterling,Ill. N15 .....4.775
Struthers,O. Y1 .....4.675
SparrowsPoint,Md. B2..4.775
Torrance,Calif. C11 ...5.475
Worcester,Mass. A7 ...4.975

STRUCTURALS

Carbon Steel Stand. Shapes
Ala.City,Ala. R2 .....4.25
Aliquippa,Pa. J5 .....4.25
Bessemer,Ala. T2 .....4.25
Bethlehem,Pa. B2 .....4.30
Birmingham C15 .....4.25
Clairton,Pa. U5 .....4.25
Fairfield,Ala. T2 .....4.25
Fontana,Calif. K1 .....4.90
Gary,Ind. U5 .....4.25
Geneva,Utah C11 .....4.25
Houston S5 .....4.65
Ind.Harbor,Ind I-2 ....4.25
Johnstown,Pa. B2 ....4.30
KansasCity,Mo. S5 ....4.85
Lackawanna,N.Y. B2...4.30
LosAngeles B3 .....4.95
Minnequa,Colo. C10 ....4.70
Munhall,Pa. U5 .....4.25
Niles,Calif. P1 .....4.80
Phoenixville,Pa. P4 ....3.95
Portland,Oreg. O4 .....5.00
Seattle B3 .....5.00
So.Chicago U5, W14 ....4.25
So.SanFrancisco B3 ....4.90
Torrance,Calif. C11 ....4.95
Weirton,W.Va. W6 .....4.25

Wide Flange
Bethlehem,Pa. B2 .....4.30
Clairton,Pa. U5 .....4.25
Fontana,Calif. K1 ....5.25
Lackawanna,N.Y. B2 ..4.30
Munhall,Pa. U5 .....4.25
Phoenixville,Pa. P4 ....3.95
So.Chicago,Ill. U5 ....4.25

Alloy Stand. Shapes
Clairton,Pa. U5 .....5.20
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.20
Houston S5 .....5.60
Munhall,Pa. U5 .....5.20
So.Chicago,Ill. U5 .....5.20

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....6.40
Bessemer,Ala. T2 .....6.40
Bethlehem,Pa. B2 ....6.45
Clairton,Pa. U5 .....6.40
Fairfield,Ala. T2 .....6.40
Fontana,Calif. K1 ....7.05
Gary,Ind. U5 .....6.40
Geneva,Utah C11 .....6.40
Houston S5 .....6.80
Ind.Harbor,Ind. I-2, Y1.6.40
Johnstown,Pa. B2 .....6.45
KansasCity,Mo. S5 ....7.00
Lackawanna,N.Y. B2 ..6.45
LosAngeles B3 .....7.10
Munhall,Pa. U5 .....6.40
Seattle B3 .....7.15
So.Chicago,Ill. U5, W14.6.40
So.SanFrancisco B3 ....7.05
Struthers,O. Y1 .....6.40

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ..6.45
Munhall,Pa. U5 .....6.40
So.Chicago,Ill. U5 .....6.40

PILING

BEARING PILES
Munhall,Pa. U5 .....4.25
So.Chicago,Ill. U5 .....4.25

STEEL SHEET PILING
Ind.Harbor,Ind. I-2....5.075
Lackawanna,N.Y. B2 ..5.075
Munhall,Pa. U5 .....5.075
So.Chicago,Ill. U5 ....5.075

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 .....4.225
Aliquippa,Pa. J5 .....4.225
Ashland,Ky.(15) A10 ..4.225
Bessemer,Ala. T2 .....4.225
Buffalo R2 .....4.225
Clairton,Pa. U5 .....4.225
Claymont,Del. C22 ....4.225
Cleveland J5, R2 ....4.225
Coatesville,Pa. L7 .....4.225
Conshohocken,Pa. A3 ..4.225
Ecorse,Mich G5 .....4.375
Fairfield,Ala. T2 .....4.225
Fontana,Calif.(30) K1..4.875
Gary,Ind. U5 .....4.225
Geneva,Utah C11 .....4.225
GraniteCity,Ill. G4 ....4.425
Harrisburg,Pa. C5 ....3.975
Houston S5 .....4.625
Ind.Harbor,Ind. I-2, Y1.4.225
Johnstown,Pa. B2 ....4.225
Lackawanna,N.Y. B2 ..4.225
LoneStar,Tex. L6 .....4.55
Mansfield,O. E6 .....4.225
Minnequa,Colo. C10 ...5.075
Munhall,Pa. U5 .....4.225
Newport,Ky. N9 .....4.225
Pittsburgh J5 .....4.225
Riverdale,Ill. A1 .....4.225
Seattle B3 .....5.125
Sharon,Pa. S3 .....4.225
So.Chicago,Ill. R2 ....4.225
So.Chicago,Ill. U5,W14 .4.225
SparrowsPoint,Md. B2..4.225
Steubenville,O. W10 ...4.225
Warren,O. R2 .....4.225
Weirton,W.Va. W6 ....4.225
Youngstown R2,U5,Y1 4.225

PLATES, Carbon Abras. Resist.
Fontana,Calif. K1 ....6.025
Geneva,Utah C11 .....5.375

PLATES, Wrought Iron
Economy,Pa. B14 .....9.80

PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland J5, R2 .....6.45
Conshohocken,Pa. A3 ..6.45
Ecorse,Mich. G5 .....6.60
Fairfield,Ala. T2 .....6.45
Fontana,Calif.(30) K1 ..7.15
Gary,Ind. U5 .....6.45
Geneva,Utah C11 .....6.45
Houston S5 .....6.85
Ind.Harbor,Ind. I-2, Y1.6.45
Johnstown,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ...6.45
LosAngeles B3 .....7.35
Munhall,Pa. U5 .....6.45
Pittsburgh J5 .....6.45
Seattle B3 .....7.35
Sharon,Pa. S3 .....6.45
So.Chicago,Ill. U5, W14.6.45
SparrowsPoint,Md. B2 ..6.45
Youngstown U5, Y1 ....6.45

PLATES, Alloy
Claymont,Del. C22 ....5.80
Coatesville,Pa. L7 .....5.80
Fontana,Calif.K1 .....6.45
Gary,Ind. U5 .....5.80
Houston S5 .....6.20
Johnstown,Pa. B2 .....5.80
Munhall,Pa. U5 .....5.80
Newport,Ky. N9 .....5.80
Seattle B3 .....6.70
Sharon,Pa. S3 .....5.80
So.Chicago,Ill. U5, W14.5.80
SparrowsPoint,Md. B2 ..5.80

FLOOR PLATES
Cleveland J5 .....5.275
Conshohocken,Pa. A3 ..5.275
Harrisburg,Pa. C5 ....5.15
Ind.Harbor,Ind. I-2 ...5.275
Munhall,Pa. U5 .....5.275
So.Chicago,Ill. U5 ....5.275

PLATES, Ingot Iron
Ashland c.l. (15) A10..4.475
Ashland l.c.l. (15) A10.4.975
Cleveland c.l. R2 ....4.825
Warren,O. c.l. R2 .....4.825

BARS

BARS, Hot-Rolled Carbon
Ala.City,Ala. R2 .....4.30
Aliquippa,Pa. J5 .....4.30
Alton,Ill. L1 .....4.50
Atlanta,Ga. A11 .....4.50
Bessemer,Ala. T2 .....4.30
Birmingham C15 .....4.30
Buffalo R2 .....4.30
Canton,O. R2 .....4.40
Clairton,Pa. U5 .....4.30
Cleveland R2 .....4.30
Ecorse,Mich. G5 .....4.45
Emeryville,Calif. J7 ....5.05
Fairfield,Ala. T2 .....4.30
Fairless,Pa. U5 .....4.45
Fontana,Calif. K1 .....5.00
Gary,Ind. U5 .....4.30
Houston S5 .....4.70
Ind.Harbor,Ind. I-2, Y1.4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 .....5.00
Massillon,O. R2 .....4.40
Milton,Pa. M18 .....4.30
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....4.85
N.Tonawanda,N.Y. B11.4.30
Pittsburg,Calif. C11 ...5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
Seattle B3, N14, P23....5.05
So.Chicago, R2,U5,W14 4.30
So.Duquesne,Pa. U5 ....4.30
So.SanFran.,Calif. B3 ..5.05
Sterling,Ill.(1) N15 ....4.30
Sterling,Ill. N15 .....4.40
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 ....5.00
Warren,O. R2 .....4.30
Weirton,W.Va. W6 .....4.30
Youngstown R2, U5 ....4.30

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....5.075
Buffalo R2 .....5.075
Canton,O. R2, T7 ....5.075
Clairton,Pa. U5 .....5.075
Detroit R7 .....5.075
Ecorse,Mich. G5 .....5.225
Fontana,Calif. K1 ....6.125
Fairless,Pa. U5 .....5.225
Gary,Ind. U5 .....5.075
Houston S5 .....5.475
Ind.Harbor,Ind. I-2, Y1.5.075
Johnstown,Pa. B2 ....5.075
KansasCity,Mo. S5 ....5.675
Lackawanna,N.Y. B2..5.075
LosAngeles B3 .....6.125
Massillon,O. R2 .....5.075
Midland,Pa. C18 .....5.075
So.Chicago R2, U5, W14 5.075
So.Duquesne,Pa. U5 ..5.075
Struthers,O. Y1 .....5.075
Warren,O. C17 .....5.075
Youngstown U5 .....5.075

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.45
Bethlehem,Pa. B2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland R2 .....6.45
Ecorse,Mich. G5 .....6.60
Fairfield,Ala. T2 .....6.45
Fontana,Calif. K1 .....7.70
Gary,Ind. U5 .....6.45
Houston S5 .....6.85
Ind.Harb.,Ind. I-2, Y1..6.45
Johnstown,Pa. B2 .....6.45
KansasCity,Mo. S5 ....7.05
Lackawanna,N.Y. B2 ..6.45
LosAngeles B3 .....7.15
Pittsburgh J5 .....6.45
Seattle B3 .....7.20
So.Chicago W14 .....6.45
So.Duquesne,Pa. U5 ....6.45
So.SanFrancisco B3 ....7.20
Struthers,O. Y1 .....6.45
Warren,O. R2 .....6.45
Youngstown U5 .....6.45

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa. B2 .....4.45

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....4.30
Atlanta A11 .....4.50
Fontana,Calif. K1 .....5.00
Niles,Calif. P1 .....4.85
Portland,Oreg. O4 .....5.05
SanFrancisco S7 .....4.70

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....5.20
Gary,Ind, U5 .....5.20
Houston S5 .....5.60
KansasCity S5 .....5.80
Youngstown U5 .....5.20

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12,R2 5.40
Buffalo B5 .....5.45
Camden,N.J. P13 .....5.85
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7, C20 .....5.40
Detroit R7 .....5.40
Detroit B5, P17 .....5.60
Donora,Pa. A7 .....5.40
Elyria,O. W8 .....5.40
FranklinPark,Ill. N5 ...5.40
Gary,Ind. R2 .....5.40
GreenBay,Wis. F7 .....5.40
Hammond,Ind. L2, M13.5.40
Hartford,Conn. R2 ....5.90
Harvey,Ill. B5 .....5.40
LosAngeles R2, S30 ...6.85
Mansfield,Mass. B5 ....5.95
Massillon,O. R2, R8 ....5.40
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.85
NewCastle,Pa.(17) B4 ..5.40
Pittsburgh J5 .....5.40
Plymouth,Mich. P5 ....5.65
Putnam,Conn. W18 ....5.95
Readville,Mass. C14 ....5.95
St.Louis,Mo. M5 .....5.70
So.Chicago,Ill. W14 ....5.40
SpringCity,Pa. K3 .....5.85
Struthers,O. Y1 .....5.40
Waukegan,Ill. A7 .....5.40
Worcester,Mass. W19 ...5.85
Youngstown F3, Y1 ....5.40

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19.4.65

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....6.625
BeaverFalls,Pa. M12,R2 6.625
Bethlehem,Pa. B2 .....6.625
Buffalo B5 .....6.625
Camden,N.J. P13 .....6.80
Canton,O. T7 .....6.625
Carnegie,Pa. C12 .....6.625
Chicago W18 .....6.625
Cleveland A7, C20 .....6.625
Detroit R7 .....6.625
Detroit B5, P17 .....6.825
Donora,Pa. A7 .....6.625
Elyria,O. W8 .....6.625
Gary,Ind. R2 .....6.625
GreenBay,Wis. F7 .....6.625
Hammond,Ind. L2, M13 6.625
Hartford,Conn. R2 ....6.925
Harvey,Ill. B5 .....6.625
Lackawanna,N.Y. B2..6.625
LosAngeles S30 .....8.30
Mansfield,Mass. B5 ...6.925
Massillon,O. R2, R8 ...6.625
Midland,Pa. C18 .....6.625
Monaca,Pa. S17 .....6.625
Newark,N.J. W18 .....6.80
Plymouth,Mich. P5 ....6.825
So.Chicago W14 .....6.625
SpringCity,Pa. K3 .....6.80
Struthers,O. Y1 .....6.625
Warren,O. C17 .....6.625
Waukegan,Ill. A7 .....6.625
Worcester,Mass. A7 ....6.925
Youngstown F3, Y1 ....6.625

BARS, Reinforcing (fabricators)
Ala.City,Ala. R2 .....4.30
Atlanta A11 .....4.50
Birmingham C15 .....4.30
Buffalo R2 .....4.30
Cleveland R2 .....4.30
Emeryville,Calif. J7 ....5.05
Fairfield,Ala. T2 .....4.30
Fairless,Pa. U5 .....4.45
Fontana,Calif. K1 .....5.00
Ft.Worth,Tex.(42) T4 ..4.90
Gary,Ind. U5 .....4.30
Houston S5 .....4.70

Ind.Harbor, Ind. I-2, Y1 4.30
Johnstown,Pa. B2 ....4.30
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ...4.30
LosAngeles B3 .....5.00
Milton,Pa. M18 .....4.30
Minnequa,Colo C10 ....4.75
Niles,Calif. P1 .....4.85
Pittsburg,Calif. C11 ...5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
SandSprings,Okla. S5 ..5.15
Seattle B3, N14, P23..5.05
So.Chicago R2 .....4.30
So.Duquesne,Pa. U5 ...4.30
So.SanFrancisco B3 ...5.05
SparrowsPoint,Md. B2 ..4.30
Sterling,Ill.(1) N15 ....4.30
Sterling,Ill. N15 .....4.40
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 ....5.00
Youngstown R2, U5 ....4.30

BARS, Reinforcing
(Fabricated; to consumers)

Johnstown,Pa., ¼-1" B2 5.70
KansasCity S5 .....6.50
LosAngeles B3 .....5.95
Marion,O. P11 .....5.55
Seattle B3, N14, P23 ..6.15
So.SanFrancisco B3 ...6.00
SparrowsPt. ¼-1" B2...5.70
Williamsport,Pa. S19 ..5.60

RAIL STEEL BARS

Avis,Pa.(3) J8 .....4.25
ChicagoHts.(3) C2, I-2..4.20
ChicagoHts.(4) C2, I-2..4.30
Ft.Worth,Tex.(26) T4 ..4.75
Franklin,Pa.(3) F5 ..4.20
Franklin,Pa.(4) F5 ..4.30
Marion,O.(3) P11 .....4.15
Moline,Ill.(3) R2 .....4.30
Tonawanda(3) B12 ....4.15
Tonawanda(4) B12 ....4.30
Williamsport,Pa.(3) S19.4.30

BARS, Wrought Iron

Economy,Pa.(S.R.) B14 10.85
Economy,Pa.(D.R.) B14 13.50
Economy(Staybolt) B14 13.80
McK.Rks.(S.R.) L5 ..10.85
McK.Rks.(D.R.) L5 ..14.75
McK.Rks.(Staybolt) L5 16.25

SHEETS

SHEETS, Hot-Rolled Steel
(18 gage and heavier)

Ala.City,Ala. R2 .....4.05
Allenport,Pa. P7 .....4.05
Ashland,Ky.(8) A10 ...4.05
Cleveland J5, R2 .....4.05
Conshohocken,Pa. A3 ..4.10
Detroit(8) M1 .....4.20
Ecorse,Mich. G5 .....4.20
Fairfield,Ala. T2 .....4.05
Fairless,Pa. U5 .....4.10
Fontana,Calif. K1 ....4.825
Gary,Ind. U5 .....4.05
Geneva,Utah C11 .....4.15
GraniteCity,Ill. G4 ....4.25
Houston S5 .....4.45
Ind.Harbor,Ind. I-2, Y1.4.05
Irvin,Pa. U5 .....4.05
Kokomo,Ind. C16 .....4.15
Lackawanna,N.Y. B2 ..4.05
Mansfield,O. E6 (37) ...4.05
Mansfield,O. E6 (38) ...4.80
Munhall,Pa. U5 .....4.05
Newport,Ky. N9 .....4.05
Niles,O. N12 .....4.05
Pittsburg,Calif. C11 ....4.75
Pittsburgh J5 .....4.05
Portsmouth,O. P12 .....4.05
Riverdale,Ill. A1 .....4.05
Sharon,Pa. S3 .....4.05
So.Chicago,Ill. W14 ....4.05
SparrowsPoint,Md. B2 ..4.05
Steubenville,O. W10 ....4.05
Warren,O. R2 .....4.05
Weirton,W.Va. W6 ....4.05
Youngstown U5, Y1 ....4.05

SHEETS, H.R. (19 ga. lighter)

Ala.City,Ala. R2 .....5.35
Kokomo,Ind. C16 .....5.20
Niles,O. N12 .....4.95

SHEETS, H.R. (14 ga. heavier)
High-Strength Low-Alloy

Cleveland J5, R2 .....6.10
Conshohocken,Pa. A3 ..6.15
Ecorse,Mich. G5 .....6.25
Fairfield,Ala. T2 .....6.10
Fairless,Pa. U5 .....6.15
Fontana,Calif. K1 ....6.875
Gary,Ind. U5 .....6.10
Ind.Harbor,Ind. I-2, Y1.6.10
Irvin,Pa. U5 .....6.10
Lackawanna(35) B2 ....6.10
Munhall,Pa. U5 .....6.10
Pittsburgh J5 .....6.10
Sharon,Pa. S3 .....6.10
So.Chicago,Ill. U5 .....6.10
SparrowsPoint(36) B2 ..6.10
Warren,O. R2 .....6.10
Weirton,W.Va. W6 ....6.10
Youngstown U5, Y1 ....6.10

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(8) A10 ....4.30
Cleveland R2 .....4.65
Ind.Harbor,Ind. I-2 ....4.30
Warren,O. R2 .....4.65

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 .....4.95
Cleveland J5, R2 .....4.95
Conshohocken,Pa. A3....5.00
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....4.95
Fairless,Pa. U5 .....5.00
Follansbee,W.Va. F4 ...4.95
Fontana,Calif. K1 .....6.05
Gary,Ind. U5 .....4.95
GraniteCity,Ill. G4 ....5.15
Ind.Harbor,Ind. I-2, Y1.4.95
Irvin,Pa. U5 .....4.95
Lackawanna,N.Y. B2 ...4.95
Middletown,O. A10 ....4.95
Pittsburg,Calif. C11 ....5.90
Pittsburgh J5 .....4.95
Portsmouth,O. P12 ....4.95
SparrowsPoint,Md. B2 ..4.95
Steubenville,O. W10 ....4.95
Warren,O. R2 .....4.95
Weirton,W.Va. W6 ....4.95
Youngstown Y1 .....4.95

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 .....7.50
Ecorse,Mich. G5 .....7.65
Fairless,Pa. U5 .....7.55
Fontana,Calif. K1 .....8.55
Gary,Ind. U5 .....7.50
IndianaHarbor,Ind. Y1..7.50
Irvin,Pa. U5 .....7.50
Lackawanna(37) B2 ...7.50
Pittsburgh J5 .....7.50
SparrowsPoint(38) B2 ..7.50
Warren,O. R2 .....7.50
Weirton,W.Va. W6 ....7.50
Youngstown Y1 .....7.50

SHEETS, Cold-Rolled Ingot Iron

Clevelaid R2 .....5.55
Middletown,O. A10 .....5.45
Warren,O. R2 .....5.55

SHEETS, Culvert (16 Ga.)	Cu Alloy	Cu Fe
Ashland,Ky.	A10 6.50	....
Canton,O.	R2 ..5.70	6.15
Fairfield	T2 ....5.70	....
Gary,Ind.	U5 ...5.70	5.95
Ind.Harbor	I-2 ...6.25	6.50
Irvin,Pa.	U5 ...5.70	....
Kokomo,Ind.	C16 6.35	....
MartinsFry.,O.	W10 6.25	....
Newport,Ky.	N9 ..6.25	6.50
Pitts.,Calif.	C11..6.45	....
SparrowsPt.	B2 ..5.70	....

SHEETS, Culvert Pure Iron

Ashland,Ky. A10 .....6.75
MartinsFerry,O. W10 ..6.50
Gary,Ind. U5 .....5.95

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City,Ala. R2 .....5.45‡
Ashland,Ky. A10 .....5.45*
Butler,Pa. A10 .....5.45†
Canton,O. R2 .....5.45‡
Dover,O. R1 .....5.45‡
Fairfield,Ala. T2 .....5.45*
Gary,Ind. U5 .....5.45*
GraniteCity,Ill. G4 ....5.65‡
Ind.Harbor,Ind. I-2 ...5.45†
Irvin,Pa. U5 .....5.45†
Kokomo,Ind. C16 .....5.55‡
MartinsFerry,O. W10 ..5.45*
Middletown,O. A10 ....5.45†
Newport,Ky. N9 .....5.45†
Niles,O. N12 .....5.45‡
Pittsburg,Calif. C11 ...6.20‡
SparrowsPt.,Md. B2 ..5.45‡
Steubenville,O. W10 ...5.45‡
Weirton,W.Va. W6 ....5.45*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized
High-Strength Low-Alloy

Irvin,Pa. U5 .....8.20
SparrowsPoint(39) B2 ..8.20

SHEETS, Galvannealed Steel

Canton,O. R2 .....5.85
Irvin,Pa. U5 .....5.85
Kokomo,Ind. C16 .....5.95†
Newport,Ky. N9 .....6.00
Niles,O. N12 .....6.00

SHEETS, Galvanized Ingot Iron

Ashland,Ky.(8) A10 ....5.70
Canton,O. R2 .....6.20

SHEETS, Galvanized
Ingot Iron
(Hot-dipped continuous)

Ashland,Ky. A10 .....5.70
Butler,Pa. A10 .....5.70
Middletown,O. A10 ....5.70

SHEETS, Electrogalvanized

Cleveland(28) R2 .....6.30
Niles,O.(28) R2 .....6.30
Weirton,W.Va. W6 ....6.175

SHEETS, Aluminum Coated

Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 ...5.375
Cleveland R2 .....5.375
Gary,Ind. U5 .....5.375
GraniteCity,Ill. G4 ....5.575
Ind.Harbor,Ind. I-2 ..5.375
Irvin,Pa. U5 .....5.375
Middletown,O. A10 ....5.375
Niles,O. N12 .....5.375
Youngstown Y1 .....5.375

BLUED STOCK, 29 ga.

Follansbee,W.Va. F4 ..7.375
Follansbee(23) F4 .....6.60
Yorkville,O. W10 .....7.375

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom,W.Va. W10 5.85
Gary,Ind. U5 .....5.85
Mansfield,O. E6 .....5.85
Middletown,O. A10 ....5.85
Niles,O. N12 .....5.85
Weirton,W.Va. W6 ....5.85

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.25

SHEETS, Well Casing

Fontana,Calif. K1 ....6.325

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div. Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C31 Chester Blast Furnace Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
M16 Md. Fine&Special Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng. HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P23 Pacific Steel Rolling

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div. Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless WeldedProducts
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.

T2 Tenn. Coal & Iron Div.
T3 Tenn.Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan.San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W.Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2....4.05
Allenport,Pa. P7 .....4.05
Alton,Ill. L1 .....4.225
Ashland,Ky.(8) A10 ....4.05
Atlanta A11 .....4.25
Bessemer,Ala. T2 .....4.05
Birmingham C15 .....4.05
Bridgeport,Conn.(10)S15 4.05
Buffalo(27) R2 .....4.05
Conshohocken,Pa. A3....4.10
Detroit M1 .....4.20
Ecorse,Mich. G5 .....4.20
Fairfield,Ala. T2 .....4.05
Fontana,Calif. K1 ....4.825
Gary,Ind. U5 .....4.05
Houston,Tex. S5 .....4.45
Ind.Harbor,Ind. I-2, Y1.4.05
Johnstown,Pa.(25) B2 ..4.05
KansasCity,Mo.(9) S5 ..4.65
Lackaw'na,N.Y.(25) B2.4.05
LosAngeles(25) B3 .....4.80
Milton,Pa. M18 .....4.05
Minnequa,Colo. C10 ....5.15
NewBritain(10) S15 ....4.05
N.Tonawanda,N.Y. B11.4.05
Pittsburg,Calif. C11 ....4.80
Portsmouth,O. P12 .....4.05
Riverdale,Ill. A1 .....4.05
SanFrancisco S7 .....5.00
Seattle(25) B3, P23 ....5.05
Seattle N14 .....5.05
Sharon,Pa. S3 .....4.05
So.Chicago,Ill. W14 ....4.05
So.SanFrancisco(25) B3.4.80
SparrowsPoint,Md. B2 ..4.05
Sterling(1) N15 .....4.05
Sterling,Ill. N15 .....4.15
Torrance,Calif. C11 ....4.80
Warren,O. R2 .....4.05
Weirton,W.Va. W6 .....4.05
Youngstown U5 .....4.05

STRIP, Hot-Rolled Alloy

Bridgeport,Conn.(10)S15 6.45
Carnegie,Pa. S18 .....6.70
Fontana,Calif. K1 .....8.10
Gary,Ind. U5 .....6.70
Houston,Tex. S5 .....7.10
KansasCity,Mo. S5 .....7.30
LosAngeles B3 .....7.90
NewBritn.,Conn.(10)S15 6.45
Newport,Ky. N9 .....6.70
Seattle P23 .....7.80
Sharon,Pa. S3 .....6.70
So.Chicago W14 .....6.70
Youngstown U5 .....6.70

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2 .....6.15
Conshohocken,Pa. A3 ...6.15
Ecorse,Mich. G5 .....6.30
Fairfield,Ala. T2 .....6.15
Fontana,Calif. K1 .....7.25
Gary,Ind. U5 .....6.15
Houston S5 .....6.55
Ind.Harbor,Ind. I-2, Y1.6.15
KansasCity,Mo. S5 ....6.75
Lackawanna,N.Y. B2 ..6.15
LosAngeles(25) B3 .....6.90
Seattle(25) B3, P23.....7.15
Sharon,Pa. S3 .....6.15
So.SanFrancisco(25) B3.6.90
SparrowsPoint,Md. B2 ..6.15
Warren,O. R2 .....6.15
Weirton,W.Va. W6 ....6.15
Youngstown U5, Y1 ....6.15

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....4.30
Warren,O. R2 .....4.65

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....5.75
Baltimore T6 .....5.75
Bridgeport,Conn.(10)S15 5.75
Cleveland A7, J5 .....5.75
Conshohocken,Pa. A3 ..5.80
Dearborn,Mich. D3 .....5.90
Detroit D2, M1 .....5.90
Detroit P20 .....*5.90*
Dover,O. G6 .....5.75
Ecorse,Mich. G5 .....5.90
Follansbee,W.Va. F4 ...5.75
Fontana,Calif. K1 .....7.65
FranklinPark,Ill. T6 ....5.85
Ind.Harbor,Ind. I-2 ....5.85
Indianapolis C8 .....5.90
Lackawanna,N.Y. B2 ....5.75
LosAngeles C1 .....7.80
Mattapan,Mass. T6 ....6.30
Middletown,O. A10 ....5.75
NewBedford,Mass. R10..6.20
NewBritain(10) S15 ....5.75
NewCastle,Pa. B4, E5 ..5.75
NewHaven,Conn. A7 ....6.50
NewHaven,Conn. D2 ....6.20
Pawtucket,R.I. R3 ....6.40
Pawtucket,R.I. N8 ....6.30
Pittsburgh J5 .....5.75
Portsmouth,O. P12 ....5.75
Riverdale,Ill. A1 .....5.85
Rome,N.Y.(32) R6 ....5.75
Sharon,Pa. S3 .....5.75
SparrowsPt.,Md. B2 ....5.75
Trenton,N.J.(31) R5 ..7.30
Wallingford,Conn. W2...6.20
Warren,O. B9, R2, T5..5.75
Weirton,W.Va. W6 .....5.75
Worcester,Mass. A7 ....6.60
Youngstown C8, Y1 ....5.75

STRIP, Cold-Rolled Alloy

Carnegie,Pa. S18 .....12.45
Cleveland A7 .....12.45
Dover,O. G6 .....12.45
Fontana,Calif. K1 ....14.55
FranklinPark,Ill. T6 ..12.45
Harrison,N.J. C18 ....12.45
Mattapan,Mass. T6 ....12.80
Pawtucket,R.I. N8 ....12.80
Sharon,Pa. S3 .....12.45
Worcester,Mass. A7 ...12.75
Youngstown C8.....12.90

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7, J5 .....8.60
Dearborn,Mich. D3 ....8.75
Dover,O. G6 .....8.60
Ecorse,Mich. G5 .....8.75
Lackawanna,N.Y. B2 ..8.425
Pittsburgh J5 .....8.60
Sharon,Pa. S3 .....8.60
SparrowsPoint,Md. B2..8.425
Warren,O. R2 .....8.60
Weirton,W.Va. W6 .....8.60
Youngstown Y1 .....8.60

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....6.35

STRIP, Electrogalvanized

Dover,O. G6 .....5.75*
Riverdale,Ill. A1 .....5.85*
Youngstown C8 .....5.75*
Warren,O. B9 .....5.75*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....6.15
Warren,O. B9 .....6.15

TIGHT COOPERAGE HOOP

Atlanta A11 .....4.775
Riverdale,Ill. A1 .....4.625
Sharon,Pa. S3 .....4.475
Youngstown U5 .....4.475

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	5.75	8.35	9.30	11.45	14.15
Bridgeport,Conn.(10) S15	5.75	8.05	9.00	11.15	13.85
Bristol,Conn. W1	...	...	9.30	11.45	....
Carnegie,Pa. S18	...	8.05	9.00	11.15	13.85
Cleveland A7	5.75	8.05	9.00	11.15	13.85
Cleveland C7	...	8.05	9.00	11.15	13.85
Dearborn,Mich. D3	5.90	8.25	9.20	....	....
Detroit D2	5.90	8.25	9.20	10.95	....
Dover,O. G6	5.85	8.05	9.00	11.15	13.85
FranklinPark,Ill. T6	5.85	8.05	9.00	11.15	13.85
Harrison,N.J. C18	...	...	9.30	11.45	14.15
Indianapolis C8	6.00	8.20	9.00	11.15	13.85
Mattapan,Mass. T6	6.30	8.35	9.30	11.45	14.15
NewBritn.,Conn.(10) S15.	5.75	8.05	9.00	11.15	13.85
NewCastle,Pa. B4	5.75	8.05	9.00	11.15	....
NewCastle,Pa. E5	5.75	8.05	9.00	11.15	13.85
NewHaven,Conn. D2	6.20	8.35	9.30	11.25	....
NewYork W3	...	8.35	9.30	11.45	14.15
Pawtucket,R.I. N8	6.30	8.35	9.30	11.45	14.15
Riverdale,Ill.(1) A1	5.85	8.05	9.00	11.15	13.85
Rome,N.Y.(32) R6	5.75	8.05	9.00	10.95	13.25
Sharon,Pa. S3	5.75	8.05	9.00	11.15	13.85
Trenton,N.J. R5	...	8.35	9.30	11.45	14.15
Wallingford,Conn. W2	6.20	8.35	9.30	11.45	14.15
Warren,O. T5	5.75	8.05	9.00	11.15	13.85
Weirton,W.Va. W6	5.75	8.05	9.00	11.15	13.85
Worcester,Mass. A7, T6.	6.60	8.35	9.30	11.45	14.15
Youngstown C8	5.85	8.05	9.00	11.15	13.85
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	12.90	15.60	....
Buffalo W12	...	...	12.90	....	....
Harrison,N.J. C18	...	...	12.90	15.60	19.00
NewYork W3	...	...	12.90	15.60	19.00
Trenton,N.J. R5	...	...	12.90	15.60	19.00
Worcester,Mass. T6	...	...	12.90	15.60	19.00
Worcester,Mass. W12	...	...	12.90	....	....
Youngstown C8	...	...	13.25	15.95	19.35

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	...	9.10	10.10	11.00
Brackenridge,Pa. A4	....	...	9.10	10.10	11.00
IndianaHarbor,Ind. I-2	8.025	8.50	9.10	10.10	....
Mansfield,O. E6	8.025	8.50	9.10	10.10	11.00
Newport,Ky. N9	8.025	8.50	9.10	10.10	11.00
Niles,O. N12	8.025	8.50	9.10	10.10	....
Vandergrift,Pa. U5	....	8.50	9.10	10.10	11.00
Warren,O. R2	8.025	8.50	9.10	10.10	11.00
Zanesville,O. A10	....	8.50	9.10	10.10	11.00

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	....	....	9.85	10.85	11.75
GraniteCity,Ill. G4	8.425*	8.95*	9.55*	10.55*	....
IndianaHarbor,Ind. I-2	8.225	8.75*	9.35*	....	....
Vandergrift,Pa. U5	....	9.25†	9.85†	10.85†	11.75†
Vandergrift,Pa. U5	8.225*	8.75*	9.35*	10.35*	11.25*
Warren,O. R2	8.225†	9.25	9.85	10.85	11.75
Zanesville,O. A10	....	9.25	9.85	10.85	11.75

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	11.95	12.50	13.00	14.00
Brackenridge,Pa. A4	11.95	....	....	....
Newport,Ky. N9	11.95	....	....	....
Vandergrift,Pa. U5	11.95	12.50	13.00	14.00
Zanesville,O. A10	11.95‡	12.50‡	13.00‡	14.00‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	....	15.00	16.60	17.10	....
Butler,Pa. A10	....	....	16.60	17.10	....
Vandergrift,Pa. U5	14.00	15.00	16.60	17.10	12.70‡
Warren,O. R2	....	....	....	....	12.70‡

* Semiprocessed. † Fully processed only. ‡ Coils annealed; semiprocessed ½c lower. ‖ Coils. ¾-cent higher.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.50	$7.75	$8.15
Fairfield,Ala. T2	7.60	7.85	8.25
Fairless,Pa. U5	7.60	7.85	8.25
Gary,Ind. U5	7.50	7.75	8.15
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.50	7.75	8.15
Irvin,Pa. U5	7.50	7.75	8.15
Niles,O. R2	7.50	7.75	8.15
Pittsburg,Calif. C11	8.25	8.50	8.90
SparrowsPoint,Md. B2	7.60	7.85	8.25
Weirton,W.Va. W6	7.50	7.75	8.15
Yorkville,O. W10	7.50	7.75	8.15

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa,Pa. J5	6.175	....	....
Niles,O. R2	6.175	6.375	6.575

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.80	$9.05
Fairfield,Ala. T2	8.90	9.15
Fairless,Pa. U5	8.90	9.15
Gary,Ind. U5	8.80	9.05
Ind.Har. I-2, Y1	8.80	9.05
Irvin,Pa. U5	8.80	9.05
Pitts.,Cal. C11	9.55	9.80
Sp.Pt.,Md. B2	8.90	9.15
Warren,O. R2	8.80	9.05
Weirton,W.Va. W6	8.80	9.05
Yorkville,O. W10	8.80	9.05

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$6.60
Fairfield,Ala. T2 .....6.70
Fairless,Pa. U5 .....6.70
Gary,Ind. U5 .....6.60
GraniteCity,Ill. G4 .....6.70
Ind.Harbor,Ind. I-2, Y1.6.60
Irvin,Pa. U5 .....6.60
Niles,O. R2 .....6.60
Pittsburg,Calif. C11 ....7.35
SparrowsPoint,Md. B2 ..6.70
Warren,O. R2 .....6.60
Weirton,W.Va. W6 .....6.60
Yorkville,O. W10 .....6.60

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4 ...6.20
Gary,Ind. U5 .....6.20
GraniteCity,Ill. G4 .....6.30
Ind.Harbor,Ind. Y1 ....6.20
Irvin,Pa. U5 .....6.20
Yorkville,O. W10 .....6.20

MANUFACTURING TERNES (Special Coated; Base Box)

Gary,Ind. U5 .....$7.85
Irvin,Pa. U5 .....7.85
Yorkville,O. W10 .....7.85

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10 .....$8.75

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5 .....9.85

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..5.75
Aliquippa,Pa. J5 .....5.75
Alton,Ill. L1 .....5.925
Atlanta A11 .....5.95
Bartonville,Ill. K4 ....5.85
Buffalo W12 .....5.75
Chicago W13 .....5.75
Cleveland A7, C20 ....5.75
Crawfordsville,Ind. M8..5.85
Donora,Pa. A7 .....5.75
Duluth,Minn. A7 .....5.75
Fairfield,Ala. T2 .....5.75
Fostoria,O.(24) S1 .....5.95
Houston S5 .....6.15
Jacksonville,Fla. M8 ....6.27
Johnstown,Pa. B2 .....5.75
Joliet,Ill. A7 .....5.75
KansasCity,Mo. S5 .....6.35
Kokomo,Ind. C16 .....5.85
LosAngeles B3 .....6.70
Minnequa,Colo. C10 ....6.00
Monessen,Pa. P7 .....5.75
Newark 6-8 ga. I-1 ....6.40
No.Tonawanda B11 ....5.75
Palmer,Mass. W12 .....6.05
Pittsburg,Calif. C11 ....6.70
Portsmouth,O. P12 .....5.75
Rankin,Pa. A7 .....5.75
So.Chicago,Ill. R2 .....5.75
So.SanFrancisco C10 ....6.70
SparrowsPoint,Md. B2 ..5.85
Sterling,Ill.(1) N15 ....5.75
Sterling,Ill. N15 .....5.85
Struthers,O. Y1 .....5.75
Waukegan,Ill. A7 .....5.75
Worcester,Mass. A7 ....6.05

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....7.20
Alton,Ill. L1 .....7.375
Bartonville,Ill. K4 .....7.30
Buffalo W12 .....7.20
Cleveland A7 .....7.20
Donora,Pa. A7 .....7.20
Duluth,Minn. A7 .....7.20
Fostoria,O. S1 .....7.20
Johnstown,Pa. B2 .....7.20
LosAngeles B3 .....8.15
Millbury,Mass.(12) N6 ..7.50
Minnequa,Colo. C10 ....7.45
Monessen,Pa. P7, P16...7.20
Muncie,Ind. I-7 .....7.40
Palmer,Mass. W12 .....7.50
Pittsburg,Calif. C11 ....8.15
Portsmouth,O. P12 .....7.20
Roebling,N.J. R5 .....7.50
So.Chicago,Ill. R2 .....7.20
So.SanFrancisco C10 ...8.15
SparrowsPt.,Md. B2 ....7.30
Struthers,O. Y1 .....7.20
Trenton,N.J. A7 .....7.50
Waukegan,Ill. A7 .....7.20
Worcester A7,J4,T6,W12 7.50

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....6.90
Alton,Ill. L1 .....7.075
Buffalo W12 .....6.90
Cleveland A7 .....6.90
Donora,Pa. A7 .....6.90
Duluth,Minn. A7 .....6.90
Johnstown,Pa. B2 .....6.90
KansasCity,Mo. S5 ....7.50
LosAngeles B3 .....7.85
Minnequa,Colo. C10 ...7.075
Monessen,Pa. P7, P16 ..6.90
NewHaven,Conn. A7 ...7.20
Palmer,Mass. W12 .....7.20
Pittsburg,Calif. C11 ....7.85
Portsmouth,O. P12 .....6.90
Roebling,N.J. R5 .....7.20
So.Chicago,Ill. R2 .....6.90
So.SanFrancisco C10 ...7.85
SparrowsPoint,Md. B2 ..7.00
Trenton,N.J. A7 .....7.20
Waukegan,Ill. A7 .....6.90
Worcester,Mass. A7 ....7.20

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1 .....11.375
Bartonville,Ill. K4 ....11.30
Buffalo W12 .....11.20
Chicago W13 .....11.20
Cleveland A7 .....11.20
Crawfordsville,Ind. M8.11.30
Fostoria,O. S1 .....11.20
Jacksonville,Fla. M8 ..11.73
Johnstown,Pa. B2 .....11.20
Kokomo,Ind. C16 .....11.20
Minnequa,Colo. C10 ...10.95
Monessen,Pa. P16 .....11.20
Muncie,Ind. I-7 .....11.40
Palmer,Mass. W12 .....11.50
Roebling,N.J. R5 .....11.50
So.SanFrancisco C10 ..11.55
Waukegan,Ill. A7 .....11.20
Worcester,Mass. A7,T6.11.50

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4 .....9.90
Buffalo W12 .....9.90
Johnstown,Pa. B2 .....9.90
Minnequa,Colo. C10 ...10.025
Monessen,Pa. P16 .....9.90
Muncie,Ind. I-7 .....10.10
Portsmouth,O. D2 .....9.90
Roebling,N.J. R5 .....10.20
SparrowsPt.,Md. B2 ....10.00

ROPE WIRE	(A)
Alton,Ill. L1	9.45
Bartonville,Ill. K4	9.35
Buffalo W12	9.75
Fostoria,O. S1	9.75
Johnstown,Pa. B2	9.75
Monessen,Pa. P7	9.35
Monessen,Pa. P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Portsmouth,O. P12	9.35
Roebling,N.J. R5	10.05
SparrowsPt. B2	9.85
Struthers,O. Y1	9.75
Worcester J4, T6	9.65

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE

(Continued)

WIRE, Tire Bead

Alton, Ill. L1	12.75
Bartonville, Ill. K4	13.25
Monessen, Pa. P16	13.15
Portsmouth, O. P12	13.15
Roebling, N.J. R5	13.45

WIRE, Cold-Rolled Flat

Anderson, Ind. G6	7.95
Baltimore T6	8.25
Buffalo W12	7.95
Cleveland A7	7.95
Crawfordsville, Ind. M8	8.05
Dover, O. G6	7.95
Fostoria, O. S1	7.95
Kokomo, Ind. C16	8.05
Franklin Park, Ill. T6	8.05
Massillon, O. R8	7.95
Milwaukee C23	8.15
Monessen, Pa. P7, P16	7.95
Pawtucket, R.I. N8	8.25
Rome, N.Y. (32) R6	7.95
Trenton, N.J. R5	8.25
Worcester A7, T6, W12	8.25

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala. City, Ala. R2	6.90 7.30**
Aliquippa J5	6.90 7.425§
Atlanta A11	7.00 7.55
Bartonville (48) K4	7.00 7.55
Buffalo W12	6.90 7.30†
Cleveland A7	6.90 —
Crawfordsville M8	7.00 7.55
Donora, Pa. A7	6.90 7.30†
Duluth, Minn. A7	6.90 7.30†
Fairfield T2	6.90 7.30†
Houston, Tex. S5	7.30 7.70†
Jacksonville, Fla. M8	7.425 7.95
Johnstown B2 (48)	6.90 7.45*
Joliet, Ill. A7	6.90 7.30†
Kansas City, Mo. S5	7.50 7.90†
Kokomo C16	7.00 7.40†
Los Angeles B3	7.85 —
Minnequa C10	7.15 7.55**
Monessen P7 (48)	6.90 7.45
Palmer W12	7.20 7.60†
Pitts., Calif. C11	7.85 8.25†
Portsmouth, O. P12	6.90 —
Rankin A7	6.90 7.30†
So. Chicago R2	6.90 7.30**
S.S. Fran. C10	7.85 8.25**
Sparrows Pt. B2 (48)	7.00 7.55*
Sterling (1) (48) N15	6.90 7.45
Struthers, O. (48) Y1	6.90 7.40‡
Worcester A7	7.20 —

* Based on 11c zinc; † 5c zinc; ‡ Less than 10c zinc; **Subject to zinc equalization extras.

WOVEN FENCE, 9-15½ Ga. Col.

Ala. City, Ala R2	146**
Ala. City, 17 ga. R2	241**
Ala. City, 18 ga. R2	251**
Aliq'ppa, Pa. 9-14½ ga. J5	149§
Atlanta A11	151
Bartonville, Ill. K4	151
Crawfordsville, Ind. M8	151
Donora, Pa. A7	146†
Duluth, Minn. A7	146†
Fairfield, Ala. T2	146†
Houston, Tex. S5	154†
Johnstown, Pa. (43) B2	149
Joliet, Ill. A7	146†
Kansas City, Mo. S5	158†
Kokomo, Ind. C16	148†
Minnequa, Colo. C10	154**
Monessen, Pa. 9 ga. P17	151
Pittsburg, Calif. C11	169†
Rankin, Pa. A7	146†
So. Chicago, Ill. R2	146**
Sterling, Ill. (1) N15	149

† Based on 5c zinc; * 11c zinc; § 10c zinc; **Subject to zinc equalization extras.

BALE TIES, Single loop

	Col.
Alabama City, Ala. R2	155
Atlanta A11	157
Bartonville, Ill. K4	157
Crawfordsville, Ind. M8	157
Donora, Pa. A7	155
Duluth, Minn. A7	155
Fairfield, Ala. T2	155
Joliet, Ill. A7	155
Houston S5	163
Kansas City, Mo. S5	167
Kokomo, Ind. C16	157
Minnequa, Colo. C10	160
Pittsburg, Calif. C11	179
So. Chicago, Ill. R2	155
So. San Fran., Calif. C10	179
Sparrows Point, Md. B2	157
Sterling, Ill. (1) N15	155

WIRE, Barbed

	Col.
Alabama City, Ala. R2	159**
Aliquippa J5	156§
Atlanta A11	164
Bartonville, Ill. K4	164
Crawfordsville, Ind. M8	164
Donora, Pa. A7	159†
Duluth, Minn. A7	159†
Fairfield, Ala. T2	159†
Houston, Tex. S5	167†
Johnstown, Pa. B2	162*
Joliet, Ill. A7	159†
Kansas City, Mo. S5	171†
Kokomo, Ind. C16	161†
Minnequa, Colo. C10	165**
Monessen, Pa. P7	163
Pittsburg, Calif. C11	179†
Rankin, Pa. A7	159†
So. Chicago, Ill. R2	159**
S. San Francisco C10	179**
Sparrows Point, Md. B2	164*
Sterling, Ill. (1) N15	162

† Based on 5c zinc; * 11c zinc; § 10c zinc; **Subject to zinc equalization extras.

WIRE (16 gage)

	An'd Galv. Stone	Stone
Ala. City R2	13.15	14.70**
Bartonville K4	13.25	15.10
Buffalo W12	13.15	—
Cleveland A7	13.15	—
Crawfrdsville M8	13.25	15.10
Fostoria, O. S1	13.25	14.80†
Johnstown B2	13.15	15.00*
Kokomo C16	13.25	15.10*
Minnequa C10	13.40	15.10**
Palmer, Mass. W12	13.15	14.70*
Pitts., Calif. C11	13.50	15.05†
So. Chicago R2	13.15	14.70
Sparrows Pt. B2	13.25	15.10*
Sterling (1) N15	13.15	15.00
Waukegan A7	13.15	14.70†
Worcester A7	13.45	—

* Based on 11c zinc; † 5c zinc; § 10c zinc; ** Subject to zinc equalization extras.

NAILS, Stock

To dealers & mfrs. (7)	Col.
Alabama City, Ala. R2	137
Aliquippa, Pa. J5	137
Atlanta A11	139
Bartonville, Ill. K4	139
Chicago, Ill. W13	137
Cleveland A9	142
Crawfordsville, Ind. M8	139
Donora, Pa. A7	137
Duluth, Minn. A7	137
Fairfield, Ala. T2	137
Galveston, Tex. D7	139
Houston, Tex. S5	145
Johnstown, Pa. B2	137
Joliet, Ill. A7	137
Kansas City, Mo. S5	149
Kokomo, Ind. C16	139
Minnequa, Colo. C10	142
Monessen, Pa. P7	137
Pittsburg, Calif. C11	156
Rankin, Pa. A7	137
So. Chicago, Ill. R2	137
Sparrows Pt., Md. B2	139
Sterling, Ill. (1) N15	137
Worcester, Mass. A7	143

NAILS, CUT (100 lb keg)

To dealers (33)	
Conshohocken, Pa. A3	$8.30
Wheeling, W.Va. W10	8.30

STAPLES, Polished Stock

To dealers & mfrs. (7)	Col.
Aliquippa, Pa. J5	138
Atlanta A11	140
Bartonville, Ill. K4	140
Crawfordsville, Ind. M8	140
Donora, Pa. A7	138
Duluth, Minn. A7	138
Fairfield, Ala. T2	138
Johnstown, Pa. B2	138
Joliet, Ill. A7	138
Kokomo, Ind. C16	140
Minnequa, Colo. C10	143
Monessen, Pa. P7	138
Pittsburg, Calif. C11	157
Rankin, Pa. A7	138
Sparrows Pt., Md. B2	140
Sterling, Ill. (1) N15	138
Worcester, Mass. A7	144

FENCE POSTS

	Col.
Chicago Hts., Ill. C2, I-2	150
Duluth, Minn. A7	150
Franklin, Pa. F5	150
Johnstown, Pa. B2	150
Marion, O. P11	150
Minnequa, Colo. C10	155
Moline, Ill. R2	155
So. Chicago, Ill. R2	150
Tonawanda, N.Y. B12	150
Williamsport, Pa. S19	150

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(Base discounts, per cent off list, f.o.b. midwestern plants).

4 in. and shorter:	
½-in. & smaller diam	2
Over 4 in. through 6 in.:	
½ in. & smaller diam	+3
6 in. and shorter:	
⅜-in. and ⅝-in.	+4
¾ in. and larger	+6
Longer than 6 in.:	
All diameters	+15
Lag bolts, all diams.:	
6 in. and shorter	6
Over 6 in. long	+2
Ribbed Necked Carriage	+4
Blank	10
Plow	23
Step, Elevator, Tap and Sleigh Shoes	10
Tire Bolts	+3
Boiler & Fitting-Up Bolts	21

NUTS

H.P. and C.P., regular & heavy: Square, all sizes	55
H.P., Hex, regular & heavy:	
¾" and smaller	55
⅞" to 1¼", inclusive	58
1⅜" to 1½", inclusive	60
1⅝" and larger	55
C.P. Hex regular & heavy: All sizes	55
Hot Galv. Nuts (all types):	
¾" or smaller	38
⅞" to 1½", inclusive	41
Finished Hex Nuts: New standard, all sizes	55
Semifinished & Slotted Hex: Regular and heavy, all sizes	55

SQUARE HEAD SET SCREWS

(1035 steel; packaged; per cent off list)

1 in. diam. x 6 in. and shorter	34
1 in. and smaller diam. x over 6 in.	20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	34
¼ in. diam. & larger	14
N.F. thread, all diams	8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	47.5—10
Plated finishes	30—10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
¼-in. through ⅝-in.	38
¾-in. through 1 in.	15
Longer than 6 in.:	
¼-in. through ⅝-in.	20
¾-in. through 1 in.	7

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9 25

$\frac{7}{16}$-in. under. List less 37%

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	19.59	19.00
1¼	13	....	23.21	18.77
1½	13	21.40	25.65	20.75
1¾	13	25.28	30.31	24.52
2	13	28.33	33.97	27.48
2¼	13	31.91	38.26	30.95
2¼	12	34.63	41.52	33.59
2½	12	38.15	45.74	37.00
2¾	12	41.31	49.53	40.07
3	12	44.05	52.82	42.72

RAILWAY MATERIALS

RAILS	Std. No. 1	Std. No. 2	Std. Toe Rails All No. 2	Std. Toe Rails 60 lb Under
Bessemer, Pa. U5	4.45	4.35	4.40	5.35
Ensley, Ala. T2	4.45	4.35	...	5.35
Fairfield, Ala. T2	...	...	...	5.35
Gary, Ind. U5	4.45	4.35	4.40	...
Huntington, W.Va. W7	...	...	...	5.35
Indiana Harbor, Ind. I-2	4.45	4.35	4.40	...
Johnstown, Pa. B2	...	...	...(16)	5.35
Lackawanna, N.Y. B2	4.45	4.35	...	5.35
Minnequa, Colo. C10	4.45	4.35	...	5.35
Steelton, Pa. B2	4.45	4.35	...	5.35
Williamsport, Pa. S19	...	...	...	5.35

TIE PLATES

Fairfield, Ala. T2	5.275
Gary, Ind. U5	5.275
Ind. Harbor, Ind. I-2	5.275
Lackawanna, N.Y. B2	5.275
Minnequa, Colo. C10	5.275
Seattle B3	5.425
Steelton, Pa. B2	5.275
Torrance, Calif. C11	5.425

TRACK BOLTS (20) Treated

Cleveland R2	11.50
Kansas City, Mo. S5	11.50
Lebanon, Pa. B2	11.50
Minnequa, Colo. C10	11.50
Pittsburgh O3, P14	11.50
Seattle, Wash. B3	12.00

AXLES

Ind. Harbor, Ind. S13	6.75
Johnstown, Pa. B2	6.75

JOINT BARS

Bessemer, Pa. U5	5.425
Fairfield, Ala. T2	5.425
Ind. Harbor, Ind. I-2 Y1	5.425
Joliet, Ill. U5	5.425
Lackawanna, N.Y. B2	5.425
Minnequa, Colo. C10	5.425
Pittsburgh J5	5.425

SCREW SPIKES

Cleveland R2	11.00

STANDARD TRACK SPIKES

Fairfield, Ala. T2	7.30
Ind. Harbor, Ind. I-2 Y1	7.30
Kansas City, Mo. S5	7.30
Lebanon, Pa. B2	7.30
Minnequa, Colo. C10	7.30
Pittsburgh J5	7.30
Seattle B3	7.80
So. Chicago, Ill. R2	7.30
Struthers, O. Y1	7.30
Youngstown R2	7.30

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron: 98+% Fe, annealed.	15.25
Unannealed:	
Minus 100 mesh	11.75
Minus 35 mesh	9.25
Minus 20 mesh	9.00
Swedish, c.l.f. N.Y., c.l., in bags	11.25
Domestic (Swedish), f.o.b. Riverton, N. J., in bags	9.50
Electrolytic iron:	
Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	32.50
Unannealed (99+% Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl iron: 97.9-99.8% size 5 to 10 microns—83.00-148.00	
Aluminum: Atomized, 500 lb drums, frgt, allowed:	
Carlots	30.00
Ton lots	32.00
Antimony, 500 lb lots	32.00*
Brass, ¼-ton lots	29.75-37.75†
Bronze, ¼-ton lots	31.00-39.00†
Copper:	
Electrolytic	13.75*
Reduced	13.75*
Lead	7.50*
Manganese:	
Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed	89.50
Nickel-Silver, ¼-ton lots	44.25§
Nickel-Silver, ¼-ton lots	47.00**
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	43.50
Solder	7.00*
Stainless Steel, 302	91.00
Tin	14.50*
Zinc, ¼-ton lots, 17.25-31.00‡	
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.95
Less than 1000 lb	5.10
Chromium, electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh: §70% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼" to 1 7/16"; 1 7/16" to 1 15/16" 4.75c; 1 15/16" to 7 5/16" 5.15c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 4.95c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon and 0.35c H.S.-L.A.
(31) Widths over ⅝-in.; 6.40c for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 gage & heavier; 60" & narrower.
(38) 14 gage & lighter.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25a higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. to mill zone or within switching limits, 5.10c.
(43) 9-14½ gage.
(48) 6-7 gage.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5
Ambridge, Pa. N2	13.5	...	17.5	...	20	...	21.5	...	21.5	...	20.75	...	23.25	...
Lorain, O. N3	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5
Youngstown Y1	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Alton, Ill. L1	...	...	....	....	....	....	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Benwood, W. Va. W10	24	+4.5	15.25	+10.25	7.25	+17.25	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Butler, Pa. F6	25	+3.5	17	+8.5	9.5	+15	....	..	....	..	....	..	....	....
Etna, Pa. N2	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Fairless, Pa. N3	...	...	....	....	....	....	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Fontana, Calif. K1	...	...	....	....	....	....	10.75	+6.5	13.75	+2.5	16.25	1	18.75	2.25
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	22.75	5.5	25.75	9.5	28.25	13	30.75	14.25
Lorain, O. N3	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Sharon, Pa. S4	25	+3.5	17	+8.5	9.5	+15	....	..	....	..	....	..	....	....
Sharon, Pa. M6	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Sparrows Pt., Md. B2	23	+5.5	15	+10.5	7.5	+17	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Youngstown R2, Y1	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Wheatland, Pa. W9	23	+5.5	15	+10.5	7.5	+17	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Alton, Ill. L1	30.25	14.25	30.75	14.75	32.25	15	32.25	15	....	...	....	...
Benwood, W. Va. W10	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Etna, Pa. N2	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Fairless, Pa. N3	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Fontana, Calif. K1	19.25	3.25	19.75	3.75	21.25	4	21.25	4	12.5	+5.25	12.5	+5.25
Ind. Harbor, Ind. Y1	31.25	15.25	31.75	15.75	33.25	16	33.25	16	24.5	6.75	25.5	6.75
Lorain, O. N3	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Sharon, Pa. M6	13.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Sparrows Pt., Md. B2	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Youngstown R2, Y1	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Wheatland, Pa. W9	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75

*Galvanized pipe discounts based on current price of zinc (11.50c, East St. Louis).

Stainless Steel

(Representative prices, cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	H.R. Strip	Shapes; H.R. & C.F. Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	29.50	34.25	29.75	35.25	37.25	41.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	41.50	41.50
302B	18.50	24.50	30.50	34.50	35.00	35.50	37.50	44.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	43.75	43.75
304L	....	....	36.00	41.00	39.25	42.25	44.75	48.75	48.75
306	19.50	25.50	..	36.25	37.00	37.50	42.00	51.75	46.75
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	48.00	48.00
309	26.50	34.75	42.75	49.25	49.25	50.50	53.75	62.00	62.00
309S	28.50	37.50	46.75	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	62.75	67.50	69.00	72.25	72.25
314	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.50	54.50	53.25	55.50	58.75	62.75	62.75
316L	....	....	51.50	59.50	58.25	60.50	63.75	67.75	67.75
317	33.00	43.50	57.25	66.75	67.50	68.25	70.75	77.00	77.00
318	33.50	44.00	55.25	64.50	66.25	65.50	68.75	80.25	80.25
321	22.75	29.50	35.25	40.75	41.00	42.00	45.75	50.50	50.50
330	....	....	58.00	....	....	68.50	70.00	73.75	77.75
347	31.00	41.00	45.00	56.00	56.50	52.75	57.50	65.50	65.50
348	....	....	53.75	....	....	63.25	68.25	76.50	76.50
403	....	....	27.00	30.75	....	32.00	34.25	44.00	41.25
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	39.75	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	34.25	34.25
416	....	....	24.50	28.25	....	29.25	30.50	41.25	41.25
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	52.75	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	34.75	34.75
430F	....	18.75	25.00	28.75	....	29.75	31.00	44.00	44.00
431	14.50	18.75	24.50	28.25	27.50	29.25	30.50	35.25	35.25
440A,B,C	....	28.50	29.25	34.00	....	35.00	38.50	49.25	52.75
442	....	....	28.00	....	....	30.50	35.25	48.25	47.75
446	....	....	33.50	38.25	50.25	39.50	40.75	59.75	59.75
501	....	....	14.00	14.50	21.25	16.00	18.25	29.00	29.00
502	....	....	15.25	16.00	22.25	17.00	20.00	30.00	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co, Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%
Stainless:			
302	....	31.00	31.00
304	27.60–28.10	32.50–33.20	32.50
310	36.50	41.00	....
316	32.60–33.10	37.70–42.75	42.75
318	37.00–37.50	42.20–42.70	....
321	29.36–29.80	34.40–37.00	37.00
347	30.40–30.90	35.50–40.50	40.50
405	23.40–23.90	30.60–31.10	....
410	22.00–23.40	30.10–30.60	....
430	23.40	30.60	....
Inconel	46.90	61.90	....
Nickel	38.30	51.70	....
Monel	39.70	52.66	....
Copper*	....	....	46.00

	Strip, Carbon Base: Cold-Rolled 10%	Cold-Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Copper*	28.85	35.85	25.00	32.25

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.26	5% Cr Hot Work	0.405
Extra Carbon	0.31-.315	W-Cr Hot Work	0.425
Special Carbon	0.37	V-Cr Hot Work	0.445
Oil Hardening	0.405	Hi-Carbon-Cr	0.73

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.030
18.25	4.25	1	4.75	...	2.245-2.415
18	4	2	9	...	2.615
18	4	2	....	...	1.705
18	4	1	....	...	1.540
14	4	2	5	...	2.185
13.75	3.75	2	5	...	2.185
13.5	4	3	....	...	1.805
9	3.5	..	....	...	1.115
6	4	2	....	5	1.045
6	4	3	....	6	1.290
1.5	4	1	....	8.5	0.900

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	56.50†	....
Gadsden, Ala. R2	52.38	52.88	....	....
Woodward, Ala. W15	52.38	52.88	56.50†	....
Cincinnati, deld.	....	60.58	....	....
Buffalo District				
Buffalo R2	56.00	56.50	57.00	57.50
Buffalo H1	56.00	56.50	57.00	....
Tonawanda, N.Y. W12	56.00	56.50	57.00	....
No. Tonawanda, N.Y. T9	....	56.50	57.00	57.50
Boston, deld.	66.65	67.15	67.65	....
Rochester, N.Y., deld.	59.02	59.52	60.02	....
Syracuse, N.Y., deld.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Chicago R2	56.00	....	56.50	....
Gary, Ind. U5	56.00	....	56.50	....
Indiana Harbor, Ind. I-2	56.00	....	56.50	....
So. Chicago, Ill. W14, Y1	56.00	56.50	56.50	....
So. Chicago, Ill. U5	56.00	....	56.50	57.00
Milwaukee, deld.	58.17	58.67	58.67	59.17
Muskegon, Mich., deld.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron, O., deld.	58.75	59.25	59.25	59.75
Lorain, O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem, Pa. B2	58.00	58.50	59.00	59.50
New York, deld.	....	62.28	62.78	....
Newark, deld.	61.02	61.52	62.02	62.52
Birdsboro, Pa. B10	58.00	58.50	....	....
Chester, Pa. C31	....	48.50	49.00	....
Philadelphia, deld.	....	50.16	50.66	....
Steelton, Pa. B2	58.00	58.50	59.00	59.50
Swedeland, Pa. A3	58.00	58.50	59.00	59.50
Philadelphia, deld.	59.66	....	....	....
Troy, N.Y. R2	58.00	58.50	59.00	59.50
Pittsburgh District				
Neville Island, Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	57.87	57.87	58.37
McKees Rocks, deld.	....	57.54	57.54	58.04
Lawrenceville, Homestead, Wilmerding, Monaca, deld.	....	58.16	58.16	58.66
Verona, Trafford, deld.	58.19	58.69	58.69	59.19
Brackenridge, deld.	58.45	58.95	58.95	59.45
Bessemer, Pa. U5	56.00	....	56.50	57.00
Clairton, Rankin, So. Duquesne, Pa. U5	56.00	....	....	....
McKeesport, Pa. N3	56.00	....	....	57.00
Midland, Pa. C18	56.00	....	....	....
Monessen, Pa. P7	56.00	....	....	....

	Basic	No. 2 Foundry	Malleable	Bessemer
Youngstown District				
Hubbard, O. Y1	....	....	56.50	....
Sharpsville, Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield, O. deld.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie, Pa. I-3	56.00	56.50	56.50	57.00
Everett, Mass. E1	60.50	61.00	61.50	....
Fontana, Calif. K1	62.00	62.50	....	....
Geneva, Utah C11	56.00	56.50	....	....
GraniteCity, Ill. G4	57.90	58.40	58.90	....
Ironton, Utah C11	56.00	56.50	....	....
LoneStar, Texas L6	52.00	52.50*	52.50	....
Minnequa, Colo. C10	58.00	59.00	59.00	....
Rockwood, Tenn. T2	....	52.50*	56.50	....
Toledo, O. I-3	56.00	56.50	56.50	57.00
Cincinnati, deld.	61.76	62.26	....	....

*Low phos, southern grade. †Phos., 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.00 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson, O. G2, J1	$65.00
Buffalo H1	66.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Niagara Falls, N.Y. P15	$80.50
Keokuk, Iowa, Openhearth & Fdry, freight allowed K2	85.00
Keokuk, OH & Fdry, 12½ lb pigiets, 16% Si, frgt allowed K2	88.00
Wenatchee, Wash. OH & Fdry, freight allowed K2	85.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate A7	$61.00
Rockwood, Tenn. T3	70.00
Steelton, Pa. B2	64.00
Philadelphia, deld.	67.55
Troy, N.Y. R2	64.00

Warehouse Steel Products

Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except Birmingham and St. Paul, 15 cents; Philadelphia, New York, Boston and Los Angeles, 10 cents; Buffalo, 25 cents on C.R. and galvanized sheets, C.F. and alloy bars and 20 cents on other commodities; Houston, Seattle, Spokane, Wash., no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	Stainless Type 302‡‡	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Baltimore	6.02	7.51	7.79	....	6.69	...	6.68	8.52[6]	12.04	6.72	6.37	7.76
Birmingham	6.35	7.35	8.25[2]	....	6.60	...	6.50	9.10	....	6.65	6.65	8.45
Boston	7.23	8.23	9.52	44.78[9]	7.47	...	7.20	8.60	12.45	7.49	7.37	8.50
Buffalo	6.35	7.40	8.79	....	6.70	...	6.50	7.85	12.15	6.72	6.65	7.90
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.38	7.38	8.30	45.55	6.62	...	6.51	7.50	11.90	6.69	6.52	7.64
Cincinnati	6.49	7.37	8.30	45.80	6.86	...	6.75	7.80	12.15	6.86	6.81	7.89
Cleveland	6.38	7.38	8.45	45.66	6.72	...	6.57	7.60	11.96	7.02	6.69	7.81
Detroit	6.57	7.57	8.58	43.50	6.90	7.36	6.79	7.79	12.10	7.16	6.80	7.83
Erie, Pa.	6.35	7.38	8.30	....	6.70	...	6.50	7.45[4]	....	6.69	6.52	7.64
Houston	7.35	7.80	9.93	....	7.70	9.30	7.70	9.50	....	7.60	7.35	8.75
Los Angeles	7.40	9.25	9.85	50.15	7.75	11.75	7.35	10.05	13.20	7.55	7.35	9.45
Milwaukee	6.47	7.47	8.39	....	6.71	...	6.60	7.69	11.99	6.86	6.61	7.73
Moline, Ill.	6.73	7.73	8.65	....	6.97	...	6.86	7.85	....	7.04	6.87	...
New York	6.97	7.91	8.79	44.45	7.56	...	7.37	8.73[6]	12.28	7.38	7.27	8.68
Norfolk, Va.	7.00	...	...	....	7.10	...	7.10	8.60	....	7.10	7.10	7.95
Philadelphia	6.19	7.44	8.26	41.98[9]	6.96	8.80	6.74	8.36[6]	12.10	6.54	6.49	7.51**
Pittsburgh	6.38	7.38	8.30	45.50	6.72	...	6.51	7.85	11.90	6.69	6.52	7.64
Portland, Oreg.	7.60	8.75	9.35	48.50	7.85	...	7.55	10.95	14.00	7.50	7.45	9.35
Richmond, Va.	6.43	7.39	8.67	....	6.77	...	6.71	8.33	....	7.08	6.65	8.08
St. Louis	6.67	7.67	8.59	43.89	6.91	...	6.80	7.89	12.19	7.09	6.81	7.93
St. Paul	7.04	8.04	8.96	....	7.28	...	7.17	8.26	....	7.35	7.18	8.30
San Francisco	7.55	8.95	8.70	51.65	7.80	...	7.35	10.05	13.20	7.50	7.40	9.45
Seattle	8.10	9.80	10.15	50.50	8.20	...	7.80	10.95	13.65	7.75	7.80	9.60
Spokane	8.35	9.65[7]	10.05	....	7.80	...	7.80	10.85‡‡	14.40	7.45	7.55	9.60
Washington	6.70	7.99	7.97	....	7.37	...	7.38	9.09	....	7.31	7.05	8.16

*Prices do not include gage extras; †prices include gage and coating extras, based on 11-cent zinc except in New York, Philadelphia, Los Angeles, Cincinnati (11.50-cent zinc) and in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extra; §as rolled; **⅛-in. and heavier; ††as annealed; ‡‡prices include $2 for crating; §§under ¼-in.

Base quantities, 2000 to 4999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over, except in Seattle, 2000 to 9999 lb; stainless sheets, 8000 lb except in New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999; [2]—500 to 9999 lb; [4]—4000 lb and over; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 lb to 3999 lb; [9]—f.o.b. local delivery in lots of 10,000 lb and over.

LEADING THE INDUSTRY IN DESIGN . . .

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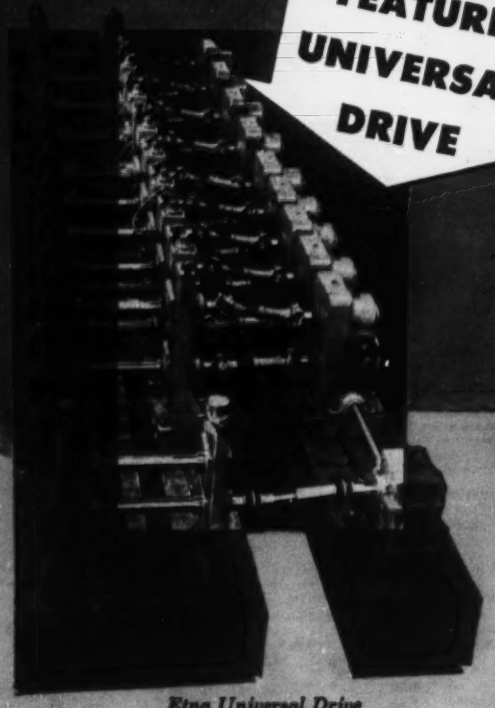

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For greater efficiency an *Oil Cooled Transformer* is incorporated into the machine. It is a *permanent unit* and *never has to be replaced.* Cooling with oil eliminates the necessity to dry out the transformer after each days work, which is necessary when water is used as a transformer coolant. Etna Mills . . . Built for continuous operation. Write for complete details.

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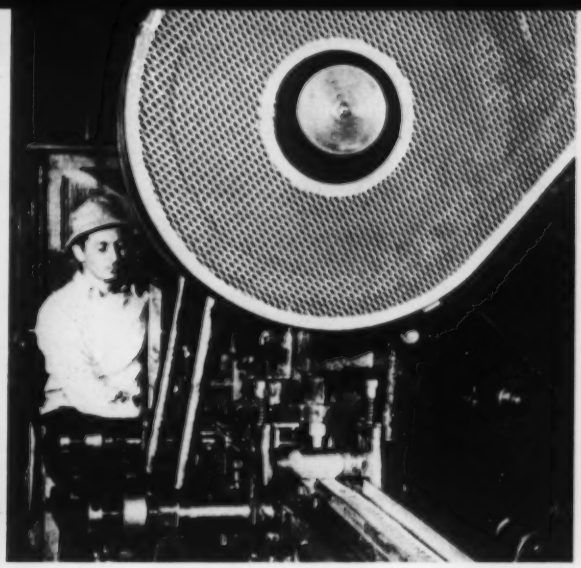
Metal Lath Manufacturers Association



Penn Metal Co. Inc.

More wet plaster construction and . . . a growing list of uses spell . . .

Another Good Year for Lath and Expanded Metal

METAL LATH and expanded metal are country cousins—alike in many respects but totally different in others. An important similarity is that both are showing sales strength this year.

Cause and Effect—As long as construction is good, so is the metal lath industry. Manufacturers of this lightweight product are riding the crest of the biggest building boom in the country's history.

Although this is not the biggest year for some of the ten members of Metal Lath Manufacturers Association, it is close enough to encourage optimism about future business. In 1950 and 1951 sales were at peak levels, but spokesmen in the industry believe that the activity was the result of "scare" buying and not truly indicative of demand. Now the heavy inventory is pretty well worked off, and heavy sales this year accurately parallel demand for and use of the product. The industry believes this is a healthier condition which will probably continue right through 1955.

Rescued—The metal lath people haven't always been so happy, however. There was a day when few buildings went up without wet plaster walls and metal lathwork. Then drywall construction came along and took much of the market. But the building boom following World War II gave the industry a shot in the arm. Emphasis was on multifamily dwellings and maximum space requirements. The rapid rate of school construction, housing developments, plus other large construction work, have acted as booster shots. Homebuilding has been of less importance in the resurgence of metal lath, being confined largely to homes in the $40,000-and-over class.

Most lath is made of copper-bearing, mild-carbon steel sheet, with some use of galvanized sheet in evidence. Experimentation with aluminum has been conducted, but there appears to be no threat here to steel's monopoly. Aluminum is still too expensive for lath use, and its one big advantage—weight—is of little importance in a market where weight is not a factor.

Relative—First cousin to metal lath, and often confused with it by the layman, is expanded metal. Lath itself is an expanded metal, but the reverse is not so. The two products are often made by the same manufacturer, but their end uses are far afield.

Expanded metal is boasted as the "material of a thousand uses." That could be true. Wheeling Corrugating Co., Wheeling, W. Va., publishes a partial list of uses containing over 175 items. That list is growing almost daily, which is one of the underlying reasons for the good year the industry is having and the promise of a good year to come. "Changing ideas by designers make us new customers today and lose us other customers at the same time," says R. M. Felsenthal, president of Exmet Electrical Corp., Tuckahoe, N. Y. New customers seem destined to outnumber lost customers for some time to come. For instance, a big boon to the industry has been the use of decorative grills on TV sets.

Heavy Stuff, Too—Use of expanded metal can also be utilitarian, ranging from heavy gratings and walkways (made from steel plate) to small high-current resistors (made from sheet). Industry uses considerable tonnages for protective enclosure of machines and belts where visibility of the enclosed parts is desired. Another new use is in garden and modernistic furniture. The fact that it can be coated with almost any finish makes expanded metal especially adaptable to this type of end use. Further enhancing its value as a "growth" product is the fact that it can be made

from almost any sheet metal specified, from ordinary carbon steel to pure silver.

Both lath and expanded metal make economical use of the metals from which they are made. For instance, the latter can be expanded to 10 times its original width with no loss of strength and no waste. The main manufacturing processes for both are slitting and expanding, although some sheet lath is punched, resulting in some loss of metal.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 209 & 210

While deliveries on flat-rolled sheets are steadily lengthening, fairly prompt shipments still can be had from a few mills. Some sellers can do three to four weeks on hot-rolled and six to eight weeks on cold-rolled. But a number of producers are heavily booked on cold-rolled well into first quarter.

Galvanized sheet shipments extend up to 20 weeks on the continuous hot-dipped grade, in some instances even longer. Certain sellers quote late April. On the noncontinuous grade deliveries extend 14 to 16 weeks on the lighter gages; on the heavier gages, six to eight.

Some buying of galvanized for inventory is noted as deliveries lengthen. This is true, also, in somewhat less degree, of cold-rolled sheets. Stainless sheets are more active, with delivery extending into January for some mills.

Eastern sellers report automotive buying only indirectly affecting delivery promises. Improvement in specifications from such major buying groups as household appliances, building products manufacturers and warehouses also are prominent in the current surge in demand. Radio and television requirements are seasonally slow and air-conditioning needs are not up to expectations.

Orders for cold-rolled sheets from the automakers continue to mount at Pittsburgh. Several area producers are moving close to 100 per cent capacity operations. They aren't turning away orders, but they are steadily extending delivery promises.

St. Louis district mills are getting the overflow demand for cold-rolled sheets from the Chicago area. Bookings extend into first quarter. No letup in buying of cold-rolled is in sight at Chicago, automotive needs being the chief factor for the surge in the market. Appliances, however, are exerting an increasing influence, and buyers, generally, are adopting more forward buying policies to protect themselves into early 1955.

Production has zoomed to a new high in the Cincinnati area, while in New England heavier buying of flat-rolled sheets and strip, accounts for more than half of the approximate 15 point increase in steel production from the year's low point.

Superior Steel Corp., Carnegie, Pa., booked a contract for $2,675,632 for over 3 million lb of 30 cal. bullet jacket cups from the Pittsburgh Ordnance District. They will be made of gilding metal clad steel strip at the company's new $7.5 million plant opened last year.

Alan Wood Steel Co. contemplates getting its 30-in., 4-stand, 4-high tandem cold mill in operation by late December or early January. It has established a price of $5 per 100 lb, Conshohocken, Pa., on cold-rolled sheets and $5.80, Conshohocken, on cold-rolled strip.

Armco Steel Corp.'s new heavy gage continuous galvanzing line at Ashland, Ky., is in commercial production.

Plates . . .

Plate Prices, Page 208

Platemakers report business prospects a little more promising, but no important pickup in demand has developed, and no appreciable rise in volume is anticipated the remainder of this quarter.

The turn of the year should see livelier demand from the shipyards in the East, as well as a pickup in freight car requirements.

Lack of buying by the railroad industry for freight car construction and repair is the chief cause for market dullness. Also, warehouses are not ordering their usual volume, while construction requirements are slipping seasonally.

Shipments can be had for nearby delivery—two weeks for sheared and universal plates. Sellers are actively seeking orders. At Chicago, heavy industry, including plate fabricators, is operating at a satisfactory rate and specifying accordingly. On the West Coast, however, November bookings are reported off 10 per cent from October volume. In the Pacific Northwest, small shops fabricating plates are actively seeking orders with their backlogs down and business needed to keep crews intact.

About 3500 tons of plates will be required for 17 petroleum and fuel oil storage tanks at Chelsea, Mass. After long delay, permits have been granted to Eastern Gas & Fuel Associates for nine tanks, the Metropolitan Coal Co., eight tanks. An increase of 64 million gallons in storage capacity is required.

In New England the mild improvement in plate demand is not heavy enough to extend deliveries on carbon grades. Generally, plate fabricators in the area are buying to cover immediate requirements. Only competitive factors narrow margins on fabricated work. Small tank shops are going well, but they are operating on current bookings. Weldment needs are slightly heavier. Contrary to the general trend, clad plate deliveries are easing.

Wire . . .

Wire Prices, Pages 210 & 211

Demand for manufacturers' wire continues to pick up, but the lag in merchant products continues seasonally. Farm trade is at low ebb. But nails are moving well, and building mesh order books, chiefly in the Midwest, are filled through the remainder of the year.

New England district sellers report demand for manufacturers and other carbon grades of wire is leveling off for December after slight but steady gains since June. Some automotive volume for first quarter is being booked, but the bulk of requirements for new models is yet to be covered. Most wire users, including cold heading, buy for actual needs only and press for prompt shipment.

Steel Bars . . .

Bar Prices, Page 208

Consumers hot-rolled carbon bar requirements are increasing but no stringency has appeared in the market, and none is anticipated in the near future. Tonnage is still readily available for shipment from the mills on relatively short notice.

New tonnage demand is coming out from bolt and nut makers. Warehouses are specifying a little more freely and cold drawers are ordering more actively. Trading, however, still is far from brisk, and deliveries, within two to three weeks, can be obtained on virtually all sizes and shapes, even in less time if tonnage is badly needed.

Cold-drawn bar drawers, as reflected in their larger specifications for hot stock, report business has stepped up appreciably over the past several weeks. Demand is diversified, which makes for an encouraging outlook. Cold-drawn bar sales to auto builders and partsmakers are noticeably heavier at Pittsburgh where the outlook for the remainder of fourth quarter is considered favorable.

While an encouraging increase in demand for cold-finished bars is noted

(*Please turn to page* 220)

it may help you!

Titanium is a metal the world has known for a long time—and now you can put its unusual combination of valuable properties to work for you in the form of Carpenter Titanium Tubing.

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Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.

(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.). Base price per net ton $190, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, Philo, O.; Sheffield, Ala.; Portland, Oreg., and Tacoma, Wash. Add or subtract $2.60 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $198 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 29.95c per lb of contained Mn, carload packed 30.7c, ton lots 31.8c, less ton 33c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices 3c for max, 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electromanganese: Min carloads, 30c; 2000 lb to min carloads, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-85%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.00c per lb of alloy, carload packed, 11.75c, ton lots 12.65c, less ton 13.65c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max, 0.025% C (Simplex) 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. 8 M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8 M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump 4" x down and 2" x down, bulk, 24.75c per lb of contained chromium plus 12c per pound of contained silicon; 1" x down, bulk 24.90c per pound of contained chromium plus 12.2c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min 97% Cr and 1% Fe). Contract, 1" x D; packed, max 0.50%, carload $1.16, ton lots $1.18; less ton $1.20. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 9c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 50-55%, Si 2-3.5% max, C 0.5-1% max). $3.10. **Primos and High Speed Grades** (V 50-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12c per lb of contained Si, carload packed 13.6c, ton lot 15.05c, less ton 16.7c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.7c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per pound contained silicon; carload packed 14.85c; ton lots, 16.05c; less ton, 17.4c, delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.4c per lb of contained Si, carload packed 15.7c, ton lot 16.85c, less ton 18.1c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 17.25c per lb of contained Si, carload packed 18.45c, ton lot 19.4c, less ton 20.45c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe). C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max. 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.25c per lb of alloy, ton lots packed 10.15c, 200 to 1999 lb 10.50c, smaller lots 11c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 25.25c per lb of alloy, ton lot 26c, less ton 27.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min M) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) Contract, lump, carloads 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.25c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.05c per lb of briquet, c.l. packaged 12.85c, ton lot 13.65c, less ton 14.55. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.65c per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.75c per lb of briquet. Packed c.l. 7.55c, ton lot 8.35c, less ton 9.25c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.9c. Packaged c.l. 7.7c, ton lot 8.5c, less ton 9.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.02, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $12 per lb of contained Cb, less ton $12.05. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $6.25 per lb of contained Cb plus Ta, deld.; less ton lots $6.30.

Silicax Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 16.6c per lb of alloy; ton lots 18.10c; less ton lots 19.35c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 15.50c. Packed c.l. 16.50c, 2000 lb to c.l. 16.75c, less than 2000 lb 17.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, f.o.b. Langeloth, Pa., $1.32 in all sizes except powdered which is $1.41; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.14 in cans; in bags, $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.

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A product of close Metallurgical CONTROL

for the production of low alloy steel and gray iron

Pre-alloyed master alloys are leaving an indelible mark on the iron and steel industry. The element of human error is reduced many fold, since a single alloying agent, *ALLOYMET* 2030 ingot or shot, can replace many separate inoculants. A single trial of Alloymet 2030 or its companion alloys will make you an "Alloymet regular."

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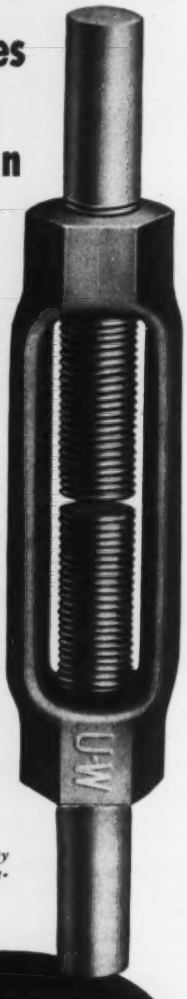

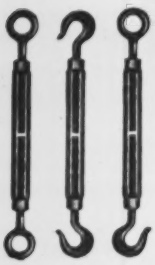

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(*Concluded from page 216*)

in New England, heavier bookings are not fully reflected in mill rolling schedules. In the smaller sizes, part of the increase in business can be filled from stock shipments. Forge shops account for most of the heavier volume, notably those supplying automotive parts.

Alloy bars are slightly more active with defense, automotive and aircraft consumers contributing to demand.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 208

Seasonal slackening in requirements for reinforcing steel is in evidence, but the mills still are entertaining substantial volume. Considerable new construction, notably highways and other public building, reportedly is in sight for next year.

Mill backlogs are declining, but operations are being maintained at a comfortable level.

In the Pacific Northwest considerable new business is pending and no extended winter slump is seen in that area. Several major projects are up for early action in the district, including 5100 tons of bars for The Dalles powerhouse, bids to be taken Dec. 15. Another project involves 1500 tons for the Ft. Lewis barracks and still another calls for 1000 tons for Seattle's Gorge dam. Bids are in on the Glenco dam, Wyoming, calling for 2000 tons.

Tubular Goods . . .

Tubular Goods Prices, Page 212

Shipments of tubular specialties will be off 40 to 45 per cent this year, say market analysts. Demand is lagging in general, although at Pittsburgh sales are reported holding at about the level of the last two months. November-December volume is not expected to change the picture much in specialties.

Sales increases continue to be reported in both buttweld and seamless pipe, but demand is at a noticeably slower pace than that for the flat-rolled products. Mills operating on sales quotas are filling November books slowly. In the East, buttweld and seamless volume shows up best in the Atlanta and Philadelphia areas.

Several defense contracts for bombs and shells are helping out in New England. These include an award for illuminating shells to the Providence, R. I. district, taking a substantial tonnage of 6⅛-in. O.D. cold drawn seamless. Better than 6000 tons of 16-in. are scheduled for a Portland, Me. shop engaged in producing

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Ores

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit deld. E. Pa.

Foundry and basic 52-62% concentrates contract 17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	20.00
N. African hematite (spot)	nom. 20.00-22.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, before duty

Foreign Wolframite, good commercial quality	$24.00-$25.00
Domestic scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, 90c-92c per long ton unit c.i.f. U. S. ports, duty for buyer's account: 46-47%, 80c.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $40.00-$42.00
48% 3:1	42.00-44.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	31.00-32.00

Domestic

(Rail nearest seller)

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb, Mo content mines unpacked $1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

50-60%	$3.50-$3.90
60-65%	4.10-4.50

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Pueblo, Colo., $94; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $114; Salina, Pa., $119; Niles O., $125; Los Angeles, Pittsburg, Calif., $137.20.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $120; Warren, Niles, O., Hays, Pa., $125; Morrisville, Pa., $123.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $130; Cutler, Utah, $121.55; Los Angeles, $127.85.

Super Duty: Hays, Sproul, Pa., Warren, Windham, O., Athens, Tex., $137; Morrisville, Pa., Niles, O., $140; Joliet, Ill., $143.

Semisilica Brick (per 1000)

Clearfield, Pa., $130.

Insulating Fire Brick (per 1000)

2300° *F:* Massillon, O. $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala. $212.80.

Ladle Brick (per 1000)

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Mo., $77.50; Wellsville, O., $81.50; Clearfield, Pa., Portsmouth, O., $87; Perla, Ark., $109; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

High-Alumina Brick (per 1000)

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $181; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Clearfield, Pa., $225; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $260; Danville, Ill., $258; Clearfield, Pa., $267.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $147; Clearfield, Pa., $148.50; St. Louis, $159.30; Athens, Tex., $155.

Nozzles (per 1000)

Reesdale, Pa., $234.70; Johnstown, Pa., $240.70; Clearfield, Pa., $241.40; St. Louis, $259.45; Athens, Tex., $247.70; Bridgeburg, Pa., $267.50.

Runners (per 1000)

Reesdale, Pa., $183.50; Johnstown, Bridgeburg, Pa., $183.50; Clearfield, Pa., $185.50; St. Louis, $195.80; Athens, Tex., $191.80.

Dolomite (per net ton)

Domestic dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Narlo, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $15.10; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite (per net ton)

Domestic, dead-burned bulk, ¾-in. grains with fines: Luning, Nev., Chewelah, Wash., $38.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.50-$14.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearny, N. J., ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	23.00
Swedeland, Pa., ovens	23.00
St. Louis, ovens	
St. Louis, deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, O., deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzol	40.00
Toluol, one deg	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $35-$36; 70%, $32-$33; 60%, $28-$29. Imported, net ton, duty paid, metallurgical grade: European, $28-$30; Mexican, $25.50.

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(Threaded with nipple, unboxed f.o.b. plant)

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Inches Diam.	Length	Per 100 lb
2	24	$43.50
2½	30	28.00
3	40	27.25
4	40	26.00
5⅛	40	25.75
6	60	23.25
7, 8, 9, 10	60	21.00
12, 14	72	20.50
16	72	20.00
17	60	20.50
18	72	20.00
20	72	20.00

CARBON

40	100	$8.95
40, 35, 30	110	8.95
30	84	9.10
24	96	8.90
24	72, 84	9.10
20	90	8.95
20	84	9.10
17	72	9.10
17	60	9.50
14	72	9.50
14, 12, 10	60	10.30
8	60	10.55

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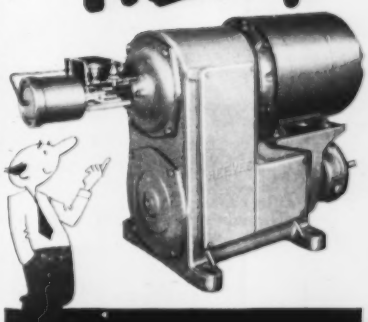

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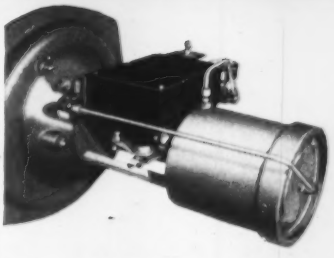

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The complete Dravo Heater package includes pressure regulators, burner, burner controls, forced draft and air supply fans, motor, thermostat, oil strainer, discharge nozzles, a heavy duty two-stage oil pump and all safety devices including electronic flame control.

A lot of these items are listed as "extras" on comparable type heaters, but on Dravo Heaters, they're standard equipment—part of Dravo's complete "packaged" heater.

Couple this feature with the many others offered by Dravo Heaters and you see why dollar for dollar, year for year, your best heating investment is Dravo Heaters.

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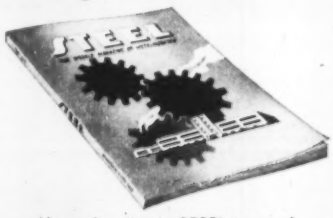

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bombs. Delivery will be in the first two quarters of next year.

Tool Steel . . .

Tool Steel Prices, Page 212

Shipments of high speed and tool steel (excluding hollow drill steel) totaled 6269 net tons in September, reports the American Iron & Steel Institute. The decline was 206 tons, or 3 per cent, compared with the 6475 tons shipped in August, and a drop of 2311 tons, or 26 per cent, compared with the 8580 tons moved in September, 1953.

Cumulative shipments in the first nine months of this year were 62,934 net tons. This was a decline of 27,390 tons, or 30 per cent, compared with 90,324 tons shipped in the like period of last year.

Steel Shipments Increase

Steel product shipments totaled 5,004,222 net tons in September, according to the American Iron & Steel Institute. This compares with shipments of 4,681,242 tons in August and 6,400,757 tons in September, 1953.

September shipments were: Carbon products, 4,688,313 tons; alloy, 280,117 tons; stainless, 35,792 tons. Shipments in the like month of last year were: Carbon, 5,908,839 tons; alloy, 444,671 tons; stainless, 47,247 tons.

Total movement of steel in the first nine months of this year was 47,450,173 net tons, divided as follows: Carbon products, 44,446,813 tons; alloy, 2,681,307 tons; stainless, 322,053 tons. In the like period of 1953 shipments totaled 61,848,324 net tons, divided as follows: Carbon products, 56,627,648 tons; alloy, 4,740,287 tons; stainless, 480,389 tons.

Rails, Cars . . .

Track Material Prices, Page 211

Steelmakers are awaiting year-end railroad contracts for tie plates, bolts and other maintenance accessories. Carriers have not indicated their 1955 placements, but the steel mills are anticipating substantial tonnage.

Structural Shapes . . .

Structural Shape Prices, Page 208

An oddity in the structural steel market is the persistent shading of fabricated steel prices despite the substantial amount of work that is constantly coming out.

Volume has leveled off some recently, but a lot of work still is being figured. Backlogs are not as extended as a year ago, still most shops are in comfortable position. Yet price cutting persists. It appears, however, that fabricated prices are reaching a point where a leveling off may be expected. They may take a slight turn for the better. At least that is the belief held by an increasing number of fabricators.

Construction requirements are beginning to dip, though the dropoff so far is slight. Fabricating shops at Chicago have shortened backlogs, but prospects are for a sizable spring pickup. Structural mills are feeling the lack of orders from the railroads and freight car builders.

With few exceptions, New England fabricators have backlogs sufficient to carry them through the winter at a high level of operation. They are buying plain material to meet commitments only. Pretty much the same situation prevails at other market points.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

12,725 tons, state bridge over Rappahanock river, Grey's Point, Va., to Bethlehem Steel Co., Bethlehem, Pa.

915 tons, public school No. 59, Queens, New York, to Bethlehem Fabricators, Bethlehem, Pa.

750 tons, generating station, Riverbank plant, near Muskogee, Okla., Oklahoma Gas & Electric Co., to Muskogee Iron Works, Muskogee, Okla..

642 tons, state bridge, Lycoming county, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

375 tons, Warwick High School, Lititz, Pa., to High Welding Co., Lancaster, Pa.

300 tons, public school No. 26, Brooklyn, New York, to Bethlehem Fabricators, Bethlehem, Pa.

150 tons, boy patient building, state hospital, Mansfield, Conn., to Kilpatrick Iron Works, Hartford.

105 tons, public school No. 127, Bronx, New York, to Bethlehem Fabricators, Bethlehem, Pa.

100 tons, Boeing Airplane Co., materials warehouse, Seattle, to Century Metal Works, Seattle.

STRUCTURAL STEEL PENDING

5812 tons, viaduct, Jersey City, N. J., for New Jersey State Turnpike Authority, bids Dec. 7.

2400 tons, maintenance hangars, Otis Air Field Base, Falmouth, Mass.; Blunt Bros., Montgomery, Ala., low.

800 tons, hangar, naval air station, Brunswick, Me.; S. Volpe Co., Boston, low.

700 tons, addition Kings County Hospital, Brooklyn, N. Y.; Gerace & Castagma, Jamaica, Long Island, New York, low on general contract.

450 tons, three bridges, Brooklyn-Queens Expressway, New York; bids closed Nov. 9.

420 tons, Kenilworth Ave. bridge, Washington, D. C.

420 tons, interchange structures, Kenilworth and Deane avenues, Washington, D. C.; bids Nov. 16, District Department of Highways.

230 tons, state bridge, Laham, Md.; bids Nov. 16.

135 tons, two span wide flange beam bridges, Woodstock-Promfret-Barnard, Vt.; bids Nov. 19, Montpelier, Vt.

135 tons, I-beam bridge and overpass, Pembroke-Concord, N. H.; bids Nov. 18, Concord, N. H.; also 50 tons concrete bars, and 50 tons steel bearing piles.

110 tons, also 22 tons of reinforcing, 280-ft truss bridge, Clackamas county, Oreg.; bids to Bureau of Public Roads, Portland, Oreg., Nov. 16.

100 tons plus, Union Pacific bridge, relocation project, The Dalles, to Lee Hoffman, Beaverton, Oreg., low at $67,006 to U. S. Engineer, Portland, Oreg.

Unstated, hangar, two shop wings and utilities, 21,460 sq ft area, McChord Air Field, Washington; bids to U. S. Engineer, Seattle, about Nov. 26.

REINFORCING BARS . . .

REINFORCING BARS PLACED

3160 tons, tunnel and approaches, Hampton Roads, Va., to Milton Steel Products Division, Merritt-Chapman & Scott Corp., New York, through the parent corporation, general contractor.

1700 tons, hospital building, Corps of Engineers, Galveston, Tex., to Ceco Steel Products Co., Birmingham; Farnsworth & Chambers Co., Houston, Tex., general contractor.

850 tons, materials warehouse, Seattle, Boeing Airplane Co., to Steel Fabricators Inc., Castroville, Calif.; Leavitt, Chandler & Co., Kirkland, Wash., general contractors.

285 tons, water reservoir, Ft. Richardson, Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle; Lease & Leigland, Seattle, general contractors.

REINFORCING BARS PENDING

800 tons, generating station, Riverbank plant, near Muskogee, Okla., Oklahoma Gas & Electric Co., to W. & W. Steel Co., Oklahoma City, Okla.

455 tons, interchange structures, Kenilworth and Leane avenues, Washington, D. C.; bids Nov. 16, District Department of Highways.

305 tons, high school, Abington, Pa., Baton Construction Co., Philadelphia, low on general contract.

295 tons, municipal incinerator, Philadelphia, Conduit & Foundation Corp., Philadelphia, awarded general contract.

160 tons, Washington state highway twin bridges, Skagit county; general contract to Lockyear & White, Longview, Wash., low at $178,582.

100 tons or more, Oregon state projects awards; Lincoln county, bridge and grading, to J. C. Compton Co., McMinnville, Oreg., low $624,787; Marion county, four bridges, to Hamilton & Thomas, Eugene, Oreg., low $178,280.

100 tons or more, Montana state 231-ft bridge, Silver Bow county; general contract to W. P. Roscoe, Billings, Mont., low $83,863.

100 tons or more, 130-ft and 180-ft bridges, Curry county, Oreg.; bids to Bureau of Public Roads, Portland, Oreg., Nov. 17.

94 tons, utilidors, Ladd Air Base, Alaska; general contract to Peter Kiewit Sons Co., Seattle, low $464,543.

70 tons, also digesters and other items, sewage treatment plant, Puyallup, Wash.; Bona Fide Builders, Tacoma, Wash., low $342,691.

50 tons, also unstated for 54 and 78-in. reinforced siphons, plate pipe liners, etc.; Yakima irrigation project, Vista, Wash.; bids to be called about Nov. 18 for Yakima, Wash., office Bureau of Reclamation.

PLATES . . .

PLATES PLACED

335 tons, oil storage tanks and fire wall, Philadelphia Electric Co., Chester, Pa., to Hammond Iron Works, Bristol, Pa.

125 tons, replacement, water tanks, naval construction battalion center, Davisville, R. I., to W. E. Caldwell Co., Louisville, Ky.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Soo Line, 34 diesel units, eleven 750-hp road switchers, seven 750-hp general purpose units and eight 1200-hp switchers going to the Electro-Motive Division, General Motors Corp., La Grange, Ill.; four 1000-hp road switchers to the American Locomotive Co., New York; four 1200-hp switchers to Fairbanks-Morse & Co., Chicago.

Wisconsin Central, 24 locomotives to Electro-Motive Division, General Motors Corp., La Grange, Ill. List comprises ten 1750-hp road switchers, six 1750-hp general purpose units and eight 1200-hp switchers.

RAILROAD CARS PLACED

Fruit Growers Express Co., 200 fifty-ton refrigerator cars; construction authorized.

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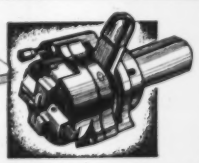

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Scrap . . .

Scrap Prices, Page 226

Pittsburgh—Price for No. 1 heavy melting holds steady as purchasing agents resist paying more than is quoted. Two mills in this area plan to relight blast furnaces in a move to trim purchases of higher-priced scrap. At the same time small purchases of prime quality No. 1 steel are being made $1 above the present range of $34 to $35.

Boston — Steel scrap prices are stabilizing, but proposed export regulations have somewhat dampened the outlook for dock shipments. The spread on No. 1 heavy melting and No. 1 bundles for domestic shipment and export widened. Brokers are paying $23, shipping point, for Pennsylvania shipment and $25 at dock. This is an increase of $1 per ton on No. 1 heavy melting for export. Domestic buying is not heavy while demand for cast is spotty in small lots at unchanged prices.

New York—Brokers' buying prices for the major grades are unchanged for the first time in several weeks. Scrap appears to be coming out a little more freely at present price levels. It is sufficient, apparently, to meet a continued good export demand, plus domestic buying.

Buffalo—An advance of $1 per ton on steelmaking grades of scrap posted a week ago on bidding by brokers has been wiped out. The area's leading mill consumer has placed orders at prices $1 under brokers' bids. The new buying jolted market sentiment. A further rise of 8.5 points in the district ingot rate and strength in other markets were ignored.

Philadelphia—Scrap prices are unchanged although the undertone continues strong. Export shipments have been disrupted recently by the stevedore strike, and this may have tended to check the uptrend in prices.

Cleveland — Scrap prices are unchanged in this market. No. 1 heavy melting is quoted $33 to $34, delivered, but demand is somewhat less pressing following the recent fairly heavy buying movement of the last several weeks.

Cincinnati—The market appears to have hit dead center, with the steel mills reluctant to pay higher prices and dealers still anticipating further advances. Last week, an upward adjustment of $1 per ton on railroad grades featured the local market.

Detroit—Some easiness is noted in the scrap market. No. 1 bundles are off slightly at $27, No. 2 bundles are quoted at $19.50, short shovel turnings, $14.

Chicago—The scrap market continues listless; a few of the less important grades have slipped a little under the pressure of consumers for lower prices. Machine shop turnings, for example, have sold for $17, off $1, and No. 2 bundles have dipped 50 cents to $24.

Birmingham — The district scrap market remains relatively firm as compared with a few weeks ago. Scarcities are reported in a few categories; they're due largely to sustained export demand.

St. Louis—Scrap market interest has hit a post-spurt lull. Consumers are waiting to see if the recent fast advance and hoarded supplies will drop prices or whether impending larger needs will hold them firm.

Los Angeles—The cast scrap market continues firm. Prices are unchanged.

San Francisco—Steel scrap prices have advanced $1 to $4 per ton, the first upward revision in months.

Seattle—The recent rise of $2 per ton on No. 1 and No. 2 heavy melting scrap is expected to stimulate country receipts because suppliers are not holding excess stocks currently.

Warehouse . . .

Warehouse Prices, Page 213

Pickup in demand for warehouse steel from the disappointing October level has failed to materialize. Many distributors are caught in a squeeze—their sales are not increasing, but flat-rolled products are harder to obtain from mills.

Somewhat heavier demand for sheet steel is counteracted by a seasonal drop-off in requirements for structurals and other construction steel items. At the same time, the large orders are gravitating to the mills; the small ones, to warehouses. Alloys are slow, notably aircraft grades.

Consumers generally have licked their excessive inventory problem and are buying for full needs. Stainless

(*Please turn to page* 228)

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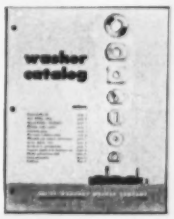

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Nov. 10	$33.67
Nov. 3	33.67
Oct. Avg.	32.25
Nov. 1953	35.00
Nov. 1949	28.96

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	31.00-32.00
No. 1 bundles	34.00-35.00
No. 2 bundles	28.00-29.00
No. 1 busheling	33.00-34.00
Machine shop turnings	19.00-20.00
Mixed borings, turnings	19.00-20.00
Short shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Cut structurals, 5 ft lengths	35.00-36.00
Heavy turnings	30.00-31.00
Punchings & plate scrap	36.00-37.00
Electric furnace bundles	36.00-37.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Charging box cast	32.00-33.00
Heavy breakable cast	31.00-32.00
Unstripped motor blocks	23.00-24.00
No. 1 machinery cast	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt	*36.50-37.50*
Rails, 2-ft and under	*45.00-46.00*
Rails, 18-in. and under	*46.00-47.00*
Rails, random lengths	*39.00-40.00*
Railroad specialties	37.50-38.50

Stainless Steel Scrap

18-8 bundles & solids	180.00-190.00
18-8 turnings	85.00-90.00
430 bundles & solids	65.00-70.00
430 turnings	50.00-52.00

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	30.00-31.00
No. 1 bundles	33.00-34.00
No. 2 bundles	26.00-27.00
No. 1 busheling	33.00-34.00
Machine shop turnings	16.00-17.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	34.00-35.00
Cut structural plate 2 ft and under	38.00-39.00
Alloy free, short shovel turnings	23.00-24.00
Electric furnace bundles	34.00-35.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Charging box cast	33.00-34.00
Stove plate	38.00-39.00
Heavy breakable cast	30.00-31.00
Unstripped motor blocks	30.00-31.00
Brake shoes	31.00-32.00
Clean auto cast	44.00-45.00
No. 1 wheels	37.00-38.00
Burnt cast	29.00-30.00
Drop broken machinery	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt	35.00-36.00
R.R. malleable	44.00-45.00
Rails, 3-ft and under	47.00-48.00
Rails, 18 in. and under	48.00-49.00
Rails, random lengths	44.00-45.00
Cast steel	36.00-37.00
Railroad specialties	36.00-37.00
Uncut tires	37.00-38.00
Angles, splice bars	43.00-44.00
Rails, rerolling	55.00-56.00

Stainless Steel (F.o.b. shipping point)

18-8 bundles, solids	170.00-180.00
18-8 turnings	70.00-80.00
430 clips, bundles, solids	nom. 70.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	30.00-31.00
No. 1 bundles	35.00-36.00
No. 2 bundles	27.00-28.00
Machine shop turnings	14.00-15.00
Short shovel turnings	22.00-23.00
Cast iron borings	22.00-23.00
Low phos.	36.00-37.00
Electric furnace bundles	36.00-37.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00

CHICAGO

No. 1 heavy melting	32.00-34.00
No. 2 heavy melting	30.00-31.00
No. 1 factory bundles	34.00-35.00
No. 1 dealer bundles	*32.00-33.00*
No. 2 bundles	*23.00-24.00*
No. 1 busheling	32.00-34.00
Machine shop turnings	*16.00-17.00*
Mixed borings, turnings	*18.00-19.00*
Short shovel turnings	*18.00-19.00*
Cast iron borings	*18.00-19.00*
Cut structurals, 3-ft	35.00-36.00
Punchings & plate scrap	35.00-36.00
Electric furnace bundles	34.00-35.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Stove plate	*32.00-33.00*
Unstripped motor blocks	25.00-26.00
Clean auto cast	*42.00-43.00*
Drop broken machinery	*42.00-43.00*

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00
R.R. malleable	42.00-44.00
Rails, 2-ft and under	50.00-51.00
Rails, 18-in. and under	51.00-52.00
Angles, splice bars	43.00-44.00
Rails, rerolling	54.00-55.00

Stainless Steel Scrap

18-8 clips & solids	175.00-180.00
18-8 turnings	75.00-80.00
430 clips & solids	65.00-70.00
430 turnings	30.00-40.00

Chicago Mercantile Exchange

No. 1 Heavy Melting (Week ended Nov. 10)

	High	Low	Close
Jan.	36.50	36.00	36.00
Mar.	36.50	36.25	36.25

Sales (40-ton units): 5 January; 2 March.

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	25.00
No. 2 heavy melting	20.00
No. 1 bundles	*27.00*
No. 2 bundles	*19.50*
No. 1 busheling	26.00
Machine shop turnings	12.00
Mixed borings, turnings	12.00
Short shovel turnings	*14.00*
Punchings & plate scrap	27.00

Cast Iron Grades

No. 1 cupola	34.00
Charging box cast	27.00
Stove plate	30.00
Heavy breakable	25.00
Unstripped motor blocks	20.00
Clean auto cast	38.00
Malleable	30.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	27.00-28.00
No. 1 bundles	30.00-31.00
No. 2 bundles	21.00-22.00
No. 1 busheling	30.00-31.00
Machine shop turnings	17.00-18.00
Mixed borings, turnings	18.00-19.00
Short shovel turnings	18.00-19.00
Cast iron borings	18.00-19.00
Low phos. 18-in.	35.00-36.00

Cast Iron Grades

No. 1 cupola	39.00
Heavy breakable cast	36.00
Charging box cast	36.00
Drop broken machinery	45.00

Railroad Scrap

No. 1 R.R. heavy melt	*33.00-34.00*
Rails, 18-in. and under	*47.00-48.00*
Rails, random lengths	*39.00-40.00*

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	33.50
No. 2 heavy melting	31.50
No. 1 bundles	33.50
No. 2 bundles	27.50
No. 1 busheling	31.00
Electric furnace bundles	33.50
Machine shop turnings	19.50
Mixed borings, turnings	19.50
Short shovel turnings	21.00-22.00
Structurals & plate	35.00-36.00
Heavy turnings	31.00-31.50
Couplers, springs, wheels	35.00
Rail crops, 2 ft & under	45.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Malleable	37.00*
Heavy breakable cast	36.00-36.50
Drop broken machinery	42.00-43.00

*Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	27.00-28.00
No. 2 bundles	21.00-22.00
Machine shop turnings	10.00-11.00
Mixed borings, short turnings	11.00-12.00
Low phos. (structural & plate)	29.00-30.00
Short shovel turnings	12.50-13.50

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstripped motor blocks	23.00-24.00

Stainless Steel

18-8 sheets, clips, solids	170.00-175.00
18-8 borings, turnings	70.00-75.00
430 sheets, clips, solids	*50.00*
410 sheets, clips, solids	*40.00*

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	23.00-24.00
No. 2 heavy melting	20.00-20.50
No. 1 bundles	24.00-25.00
No. 2 bundles	16.50-17.50
Mixed borings, turnings	10.00-10.50
Machine shop turnings	9.50-10.00
Short shovel turnings	11.50-12.00
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	32.00-33.00

BUFFALO

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	27.50-28.50
No. 1 bundles	31.00-32.00
No. 2 bundles	25.50-26.50
No. 1 busheling	31.00-32.00
Machine shop turnings	16.50-17.50
Mixed borings, turnings	18.50-19.00
Short shovel turnings	19.50-20.00
Cast iron borings	18.50-19.00
Low phos.	34.00-35.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	38.00-39.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	35.00-36.00
Rails, 3 ft and under	42.00-43.00
Railroad specialties	36.50-37.50

BIRMINGHAM

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	23.00-24.00
No. 2 bundles	19.00-20.00
Cast iron borings	16.00-17.00
Short shovel turnings	16.00-17.00
Machine shop turnings	15.00-16.00
Electric furnace bundles	29.00-30.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	45.00-46.00
Stove plate	42.00-43.00
Bar crops and plate	33.00-34.00
Structural plate, 2 ft	33.00-34.00
Unstripped motor blocks	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	30.00-31.00
Rails, 18-in. and under	40.00-41.00
Rails, rerolling	40.00-41.00
Angles, splice bars	38.00-39.00
Stand. steel axles	35.00-36.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	30.00
No. 2 heavy melting	28.00
No. 1 bundles	30.00
No. 2 bundles	23.50
Machine shop turnings	14.00
Short shovel turnings	16.00

Cast Iron Grades

No. 1 cupola	38.00
Charging box cast	29.00
Heavy breakable cast	29.00
Unstripped motor blocks	29.00
Brake shoes	30.00
Clean auto cast	41.00
Stove plate	35.00

Railroad Scrap

No. 1 R.R. heavy melt	35.00
Rails, 18-in. and under	46.00
Rails, random lengths	45.00-48.00
Rails, rerolling	*54.00-56.00*
Angles, splice bars	44.00

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	*27.00*
No. 2 heavy melting	*23.00*
No. 1 bundles	21.00
No. 2 bundles	17.00
No. 3 bundles	13.00
Machine shop turnings	12.00
Mixed borings, turnings	12.00
Short shovel turnings	12.00
Electric furnace, No. 1	32.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	32.00-35.00
Heavy breakable cast	23.00
Unstripped motor blocks	*25.00*
No. 1 wheels	21.00
Stove plate(f.o.b. plant)	28.00
Brake shoes	28.00

Railroad Scrap (Delivered consumer plant)

Rails, random lengths	30.00-34.00

LOS ANGELES

No. 1 heavy melting	20.00
No. 2 heavy melting	16.00
No. 1 bundles	20.00
No. 2 bundles	16.00
Machine shop turnings	5.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	42.00-44.00

SAN FRANCISCO

No. 1 heavy melting	*24.00*
No. 2 heavy melting	*20.00*
No. 1 bundles	*23.00*
No. 2 bundles	*18.00*
No. 1 busheling	20.00
Machine shop turnings	*6.00*
Mixed borings, turnings	*6.00*
Short shovel turnings	9.00
Cast iron borings	9.00
Cut structurals	25.00
Heavy turnings	9.00
Punchings & plate scrap	25.00
Electric furnace bundles	19.00

Cast Iron Grades

No. 1 cupola	43.00-46.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	30.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	43.00

HAMILTON, ONT.

(Delivered prices)

No. 1 heavy melting	$22.00
No. 2 heavy melting	19.00
No. 1 bundles	22.00
No. 2 bundles	17.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Rails, remelting	32.00
Busheling, new factory: Prepared	20.00
Unprepared	16.00
Short steel turnings	12.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.

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When a touch on a button moves weldments like these into the correct, most convenient position for a downhand pass, you get more arc time, more welding at lower cost. C-F power operated Positioners rotate the work in a full circle at any point in a range of 135° from the horizontal—giving welders a choice of an infinite number of downhand welding positions instantly.

Every requirement for faster, better positioned welding—constant or variable speed table rotation, full 135° tilt, self-locking gearing which holds the table in any position, oversize built-in main tilt and rotating bearings, choice of two base styles, and many other features—are built into C-F Positioners.

C-F Positioners are available in Hand or Power operated models, and are made in capacities up to 30,000 lbs. and larger.

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C-F positioned welds mean better, more economical welds

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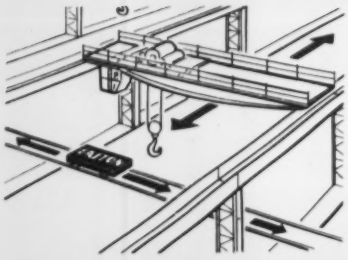
Cross-Bay Transfer

TRADE MARK



The EASTON motorized cross-bay transfer car is designed to provide lateral handling of materials to supplement overhead crane service in modern multiple bay plants. The cross-bay movement of the automatic transfer car provides a universal handling system able to spot a load anywhere on the floor of the plant. The same car system may also be used for moving materials between plant buildings.

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Sales Offices in New York
Philadelphia
Pittsburgh

AN EASTON 100-TON cross-bay transfer car showing general details of construction.

EASTON®

A-1046

(*Concluded from page 225*)

is an exception. While sales are better, there are a few gaps which suggest some inventory reduction is still under way.

To bring selling prices more closely in line with costs, warehouses in the Los Angeles district deliver f.o.b. within the city at 10 cents—a reduction of 10 cents.

Stainless Steel . . .

Stainless Steel Prices, Page 212

Production of stainless and heat resisting steel ingots amounted to 194,113 net tons in third quarter, reports the American Iron & Steel Institute. This was an increase of 10,411 tons, or about 6 per cent, compared with the 183,702 tons produced in second quarter. Compared with output of 242,000 tons in third quarter last year, however, the decine is 48,087 tons or about 20 per cent.

Cumulative production of 564,926 net tons in the first nine months this year compares with 836,403 tons in the like period of 1953, a drop of 271,475 tons or about 32 per cent.

Reflecting an earlier gain in ferro-columbium and ferro-columbium-tantalum, one producer of stainless steel has increased prices on types 347 and 348 by 5½ to 6½ cents per 100 lb, effective Nov. 1.

Pig Iron . . .

Pig Iron Prices, Page 213

Jobbing and captive foundries in the Mid-West are melting at an accelerated rate to meet expanded demand for castings. Prospects for the balance of the year are promising, especially in the automotive and farm implement industries.

Capacity production of pig iron was resumed in the St. Louis district on Nov. 8 for the first time since January.

In Chicago, U. S. Steel blew in its "E" furnace at South Works on Nov. 1, producing merchant iron.

Buffalo producers are equalizing on iron shipped into New England.

Iron Ore . . .

Iron Ore Prices, Page 221

Shipments of Lake Superior iron ore in the latest week of record (ended Nov. 8) totaled 1,148,159 gross tons, reports the Lake Superior Iron Ore Association. This compares with 1,853,937 tons moved in the corresponding week of 1953.

Cumulative shipments this season to Nov. 8 were 59,033,905 tons. Up to the same date in the 1953 shipping season 92,586,955 tons had been moved from upper lake ports.

CLASSIFIED

Help Wanted

SALES REPRESENTATIVE by Midwest Steel Manufacturer—earnings $10,000.00 to $15,000.00 or more—Protected territory. Qualifications: Mechanical or Metallurgical Engineering and/or shop experience. Write fully. Reply Box 132, STEEL, Penton Building, Cleveland 13, Ohio.

Assistant Superintendent for large Stainless Sheet and Strip Mill, located in Pittsburgh district. Must be familiar with processing methods of cold rolling, continuous annealing, pickling, etc. Should have supervisory experience. Please furnish information on background, experience, etc. with application. Reply Box 156, STEEL, Penton Building, Cleveland 13, Ohio.

Representatives Wanted

Manufacturers of heavy duty Integral Horsepower Polyphase motors for thirty years desire SALES REPRESENTATION in Pittsburgh, Cleveland and Buffalo districts. Reply Box 163, STEEL, Penton Building, Cleveland 13, Ohio.

Positions Wanted

PLANT AND PRODUCTION MANAGER, Engineering Graduate (M.I.T.) indoctrinated in practical operating experience. Proven record of accomplishment in efficient plant supervision, control, and cost reduction coupled with amicable labor relations. Reply Box 134, STEEL, Penton Building, Cleveland 13, Ohio.

ESTIMATOR AND CONTRACT MANAGER. Graduate structural engineer. 26 years experience in estimating, sales, and management of structural steel and plate fabrication. Reply Box 142, STEEL, Penton Building, Cleveland 13, Ohio.

EXPERIENCED FORGING ENGINEER AVAILABLE. Expert in hand tools and railroad work, production, design and management. Willing to travel. Passport in order. Reply Box 145, STEEL, Penton Building, Cleveland 13, Ohio.

SEASONED EXECUTIVE
With Strong Background

PRODUCTION, PLANT ENG., TOOL ENG. Desires broader opportunity. Functions well at policy level. Presently master mechanic of $3,000,000 stamping and assembly manufacturing company. Reply Box 149, STEEL, Penton Building, Cleveland 13, Ohio.

CHIEF ENGINEER

Desires change. Twenty-five years experience in sheet metal stampings and related assemblies. Specialized in progressive and deep draw dies. Good organizer, functions well at top level. Reply Box 150, STEEL, Penton Building, Cleveland 13, Ohio.

Young man desires to relocate with reputable steel warehouse. Five years experience, inside and outside sales. Reply Box 161, STEEL, Penton Building, Cleveland 13, Ohio.

Opportunities

Structural and plate fabricator located in Southeast desires additional products. Will purchase outright or will manufacture and sell same on royalty basis. Financially well rated. Twenty-five men in Engineering Department, one hundred and twenty-five men in shop. Reply Box 166, STEEL, Penton Building, Cleveland 13, Ohio.

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SALARIED POSITIONS $5,000 to $35,000. We offer the original personal employment service (established 44 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. R. W. BIXBY, INC., 665 Brisbane Bldg., Buffalo 3, N.Y.

EXPERIENCED STEEL MEN WANTED

CHIEF ENGINEER
MASTER MECHANIC
HYDRAULIC MAINTENANCE TECHNICIAN

Excellent opportunities with a small steel plant in Middle West, specializing in electric furnace production and rolling of high quality killed carbon and alloy steels.

Apply by letter stating complete qualifications and salary expected. All communications will be held in strictest confidence.

Reply Box 152, STEEL
Penton Building Cleveland 13, Ohio

PLANT SUPERINTENDENT

For small long-established Forging Plant in Akron, Ohio. Prefer man who has a good knowledge of Small Upsetters (2" sizes), Drop Hammers (3000 lbs), Maxi Presses, Punch Press, Tool and dies, etc. Plant manufactures nationally known line of Mechanic Hand Tools.

If you have proven supervisory and management ability in directing a working force of approximately 50 people, write stating full particulars, salary expected, etc.

Box 155, STEEL

Penton Building Cleveland 13, Ohio

WANTED PLANT MANAGER

Steel plate fabricating company with plant in eastern part of country has openings for high-grade man who has proven ability in the manufacture of pressure vessels and related shop work. Replies should give complete information on training, experience and salary requirements. Write Box 162, STEEL, Penton Building, Cleveland 13, Ohio.

POWER AUTHORITY OF THE STATE OF NEW YORK ADVERTISEMENT FOR PROPOSALS FOR THE FABRICATION AND ERECTION OF THE SUPERSTRUCTURE FOR THE BARNHART ISLAND BRIDGE OVER THE ST. LAWRENCE RIVER NEAR MASSENA, ST. LAWRENCE COUNTY, NEW YORK SPECIFICATIONS NO. 5422-C ST. LAWRENCE CONTRACT NO. 6

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the fabrication and erection of the superstructure for the Barnhart Island Bridge over the St. Lawrence River, near Massena, St. Lawrence County, New York, until 10:30 A.M., Eastern Standard Time, on the 7th day of December 1954, at 270 Broadway, Room 1207A, New York 7, New York, at which time and place proposals will be publicly opened and read aloud.

Plans, specifications and Proposal Forms for the work will be on file in the Authority's office and in the offices of Engineers, Praeger-Kavanagh, 126 East 38th Street, New York, New York; The Hydro-Electric Power Commission of Ontario, 620 University Avenue, Toronto 2, Ontario, and may be inspected by prospective bidders during office hours.

Plans, specifications and Proposal Forms may be obtained from the Power Authority of the State of New York, 270 Broadway, Room 1300, New York 7, New York, on or after November 15, 1954, upon application and pre-payment of a fee of Forty Dollars ($40.00) per set, no part of which will be refunded. Extra sets of plans at $20.00 each or specifications at $20.00 each may be obtained by any contractor who purchases a full set.

Bids must be made upon the proposal forms included in the Contract Documents. Each proposal must be accompanied by draft or certified check payable to the order of the Power Authority of the State of New York for the sum of One Hundred Fifty Thousand Dollars ($150,000.00).

The right is reserved to reject any or all bids.

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FOR SALE

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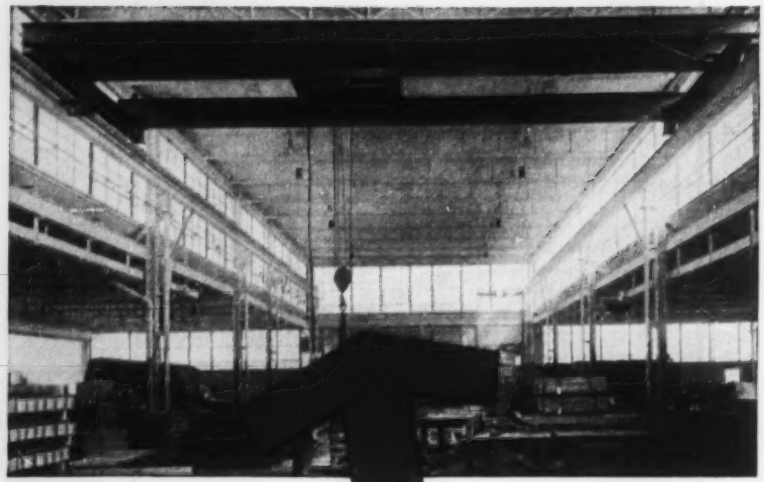

Our cranes break down!

Let's not kid ourselves. Poor maintenance, operator abuse, and just plain wearing out will put any industrial machinery out of commission.

Happily, this inevitable "down time" can be limited to hours on Michigan Cranes instead of the customary days or weeks. We use standard gears, bearings, and other expendable parts that can be purchased locally without the weeks of waiting that are often required when these parts are "custom".

Michigan is not however an "assembly shop" that throws together a lot of parts to make a crane. We just believe in using the engineering talents of many large companies and incorporating their components in our cranes when they meet our standards.

And you'll find these parts are much cheaper when replacement comes around. Those parts we make are carried in stock and can be shipped in a hurry.

For further information, write for bulletin 154 to Michigan Crane & Conveyor Corp., 114 North McKinstry Ave., Detroit 9, Michigan.

MICHIGAN

Crane & Conveyor Company

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Superior production capacity and know-how means **lower costs** from Anti-Corrosive, America's oldest and largest firm dealing **exclusively** in stainless steel fastenings!

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Bulletin 74-B tells "What the Wheelabrator Is and What It Will Do For You." Send for your copy today!

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AIRLESS BLAST CLEANING

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

Farval protects coiler against ordeal by water, grime, heat and shock

FARVAL—
Studies in Centralized Lubrication
No. 157

WHENEVER hot strip slams this coiler, bearings get an awful jolt. Consider also the effect of the heat of the steel and of high production speeds. Throw in streams of water and grime. You'll see why ordinary lubrication methods couldn't keep this coiler working steadily. That's the reason a heavy duty Farval automatic centralized lubrication system was installed.

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Farval hydraulically delivers a measured amount of clean lubricant whenever needed to every bearing of a machine. No bearings are ever missed! Regular, adequate applications of lubricant build a protective seal in each coiler-bearing against the ravages of water, dirt, heat and shock.

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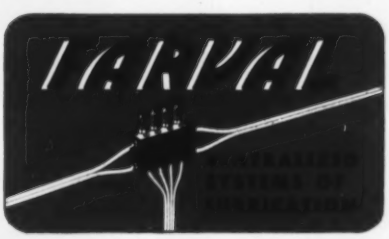
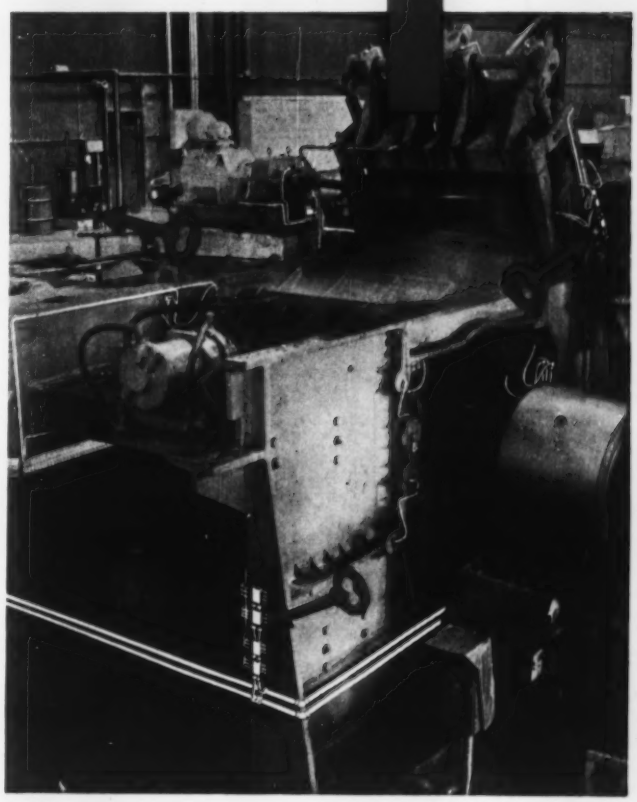
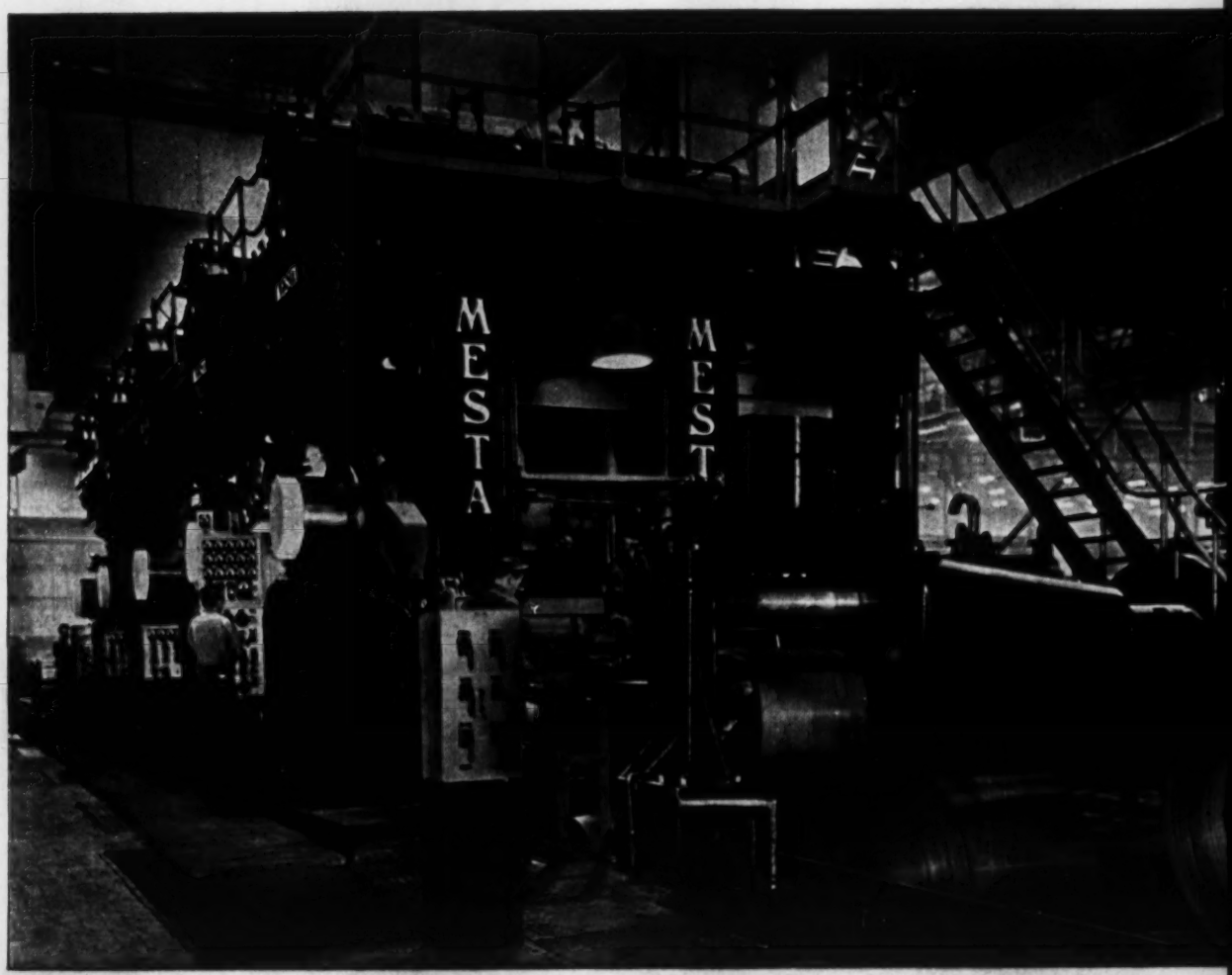
Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.





KEYS TO ADEQUATE LUBRICATION—Wherever you see the sign of Farval—the familiar valve manifolds, dual lubricant lines and central pumping station—you know a machine is being properly lubricated. Farval manually operated and automatic systems protect millions of industrial bearings.

Photograph above showing a *Farvalized* hot strip down coiler in action by courtesy of United Engineering and Foundry Co.



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High-Speed Tandem Cold Mill

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